HIGH OUTPUT, FULLY MODULATING, FULLY CONDENSING, GAS FIRED BOILERS WITH SINGLE UNIT OUTPUTS UP TO 331kW

INSTRUCTIONS FOR INSTALLATION, SERVICING & OPERATION

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1.0 general

1.1 general notes

These instructions are intended to assist the installer, commissioning engineer, maintenance engineer and user with the installation, maintenance and use of the Midimat HT gas fired condensing boiler.

Please read this manual fully before commencing the installation of the appliance. RVR Ltd. Ltd shall not be responsible for any damage resulting from failure to carefully observe the instructions given.

The Midimat HT must only be installed by persons deemed to be competent i.e. Corgi Registered. This manual must be handed to the user following completion of the installation.

1.2 certification details

The Midimat Ht complies with all relevant European Directives and has been independently Certified to comply with the requirements of prEN 483 for use in GB and IE with Gas Category II2H3P. (Natural gas G20 @ 20 mbar inlet pressure, and Propane G31 @ 37 mbar inlet pressure).

PI. No: 0085/AR/0462

The flue classification (depending upon the required flue option) is either B_{23}, C_{33}, C_{43} or C_{63x}.

2.0 product *description*

With modulating outputs of 44 to 220kW and 66 to 331kW the Midimat HT models 220 and 330 are high output, floor standing, fully condensing boilers. Both appliances are suitable for either Natural Gas or LPG.

The Midimat HT offers ultra high efficiency and low harmful emissions whilst maintaining very compact dimensions. Each appliance may be room sealed if required and is suitable for flow temperatures of up to 85°C and a maximum working pressure of 6 bar. The boilers include a wealth of enhanced operating features as standard and create bench marks for their appliance class.

Fully modulating heat output

The output of each boiler is fully variable, modulating between 20% and 100% of maximum output automatically, and instantly adjusts to match the needs of the system. The percentage of heat output at any given time can be dictated by either outside air temperature, flow temperature, room temperature (or a combination of each) or stored domestic hot water temperature.

Ultra high efficiency – fully condensing

The Midmat HT boilers are geared towards optimum operating efficiency and reduced fuel consumption. Hot flue gases pass from the primary heat exchanger through the cool return water zone created by the parallel downstream secondary spiranox stainless steel condensing heat exchangers. This principle allows efficiencies up to 109% nett to be achieved under condensing conditions and results in the exhaust gas temperature being at most only 10K above the return water temperature.

High quality materials

The use of high alloy 316L stainless steel for the Econox premix radiant burner and the Spiranox condensing heat exchangers achieves excellent corrosion resistance, heat conduction and strength affording long life and reliability.

Extremely low harmful emissions

At the heart of the boilers combustion system is the 5:1 modulating radiant cylindrical burner. The burner is fed with premix gas and air, which burns almost without a visible flame. The heat of combustion is released predominantly by radiation and the very low thermal surface loading guarantees low combustion temperatures and extremely low emission of harmful substances.

The Midimat HT boiler releases <40mg/kWh NOx (28ppm DAF) and <20mg/kWh CO (19ppm DAF) which is particularly environmentally friendly for a boiler of this size.

2.0 product description (contd)

Low Noise

The Special burner system employed in the Midimat HT boiler is extremely quiet in operation and in many cases it emits less noise than a gas fired atmospheric boiler of equivalent output.

Room sealed option

If required the boiler may be completely room sealed, taking combustion air directly from outside the building.

Note: Ventilation to boiler space will be required for cooling purposes.

Extended flue lengths

The excess fan pressure from the combustion system is 200Pa which allows the boiler to be flued over long distances using small diameter flue components.

Low water pressure cut off

The boiler includes a pressure sensor, which constantly monitors the water pressure within the boiler and will prevent the appliance from operating if the pressure falls below 0.5 bar.

Comprehensive microprocessor control

The boiler control panel includes a user friendly microprocessor control centre which manages the entire function of the appliance and encompasses:-

1. Management of the essential safety functions of burner ignition and flame monitoring.
2. Operational temperature control.
3. Safety interlock for high water temperature, high flue gas temperature, low gas inlet pressure and low system water pressure.
4. LCD display screen with 2 lines of text to continuously display operation or fault status.
5. Display of boiler temperature and water pressure.
6. Inbuilt direct-on-boiler weather compensator with automatic summer/winter changeover which provides variable flow temperature (if required).
7. Control of domestic hot water temperature (if required).
8. Self diagnostic control system.
9. PC compatibility with data logging functions, which allows communication via a laptop computer to review/modify operation parameters and access operational history as an aid to fault finding and preventative maintenance.
10. Facility to connect optional matched control components such as:- intelligent optimising modulating room temperature control unit (RE2132), under floor circuit pump (PR01) and mixing valve control unit, heating zone pump controller (MR03).
11. Facility to connect HWS primary pump or diverter valve.
12. Facility to be driven by a modulating cascade manager (KKM2) which allows multiple boilers to serve a larger load system with full modulation of the power of all of the connected boilers.
13. Inbuilt common alarm BMS volt free contacts.
14. Facility to connect a boiler pump with anti seize control and frost protection operation.

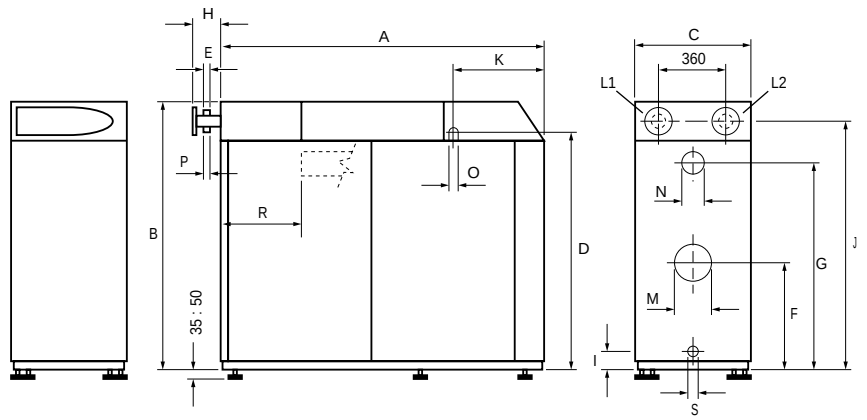
3.0 technical *details*

3.1 technical data

Table 1

Model	Midimat HT	220	330
Nominal Heat Input (Nett)	kW	42 – 210	63 – 316
Nominal Heat Output @ 80/60°C	kW	40.7 – 203.7	61.1 – 306.5
Nominal Heat Output @ 50/30°C	kW	44.1 – 220.5	66.2 – 331.8
Input Rate Nat Gas G20 (max)	m^3/h	18.87	28.31
Input Rate LPG G31 (max)	kg/h	15.54	23.31
Minimum/Maximum Gas Pressure	mbar	18/50	18/50
Max Flue Gas Volume hot (Nat Gas)	m^3/h	254.59	381.96
Max Flue Gas Volume hot (LPG)	m^3/h	210.18	315.34
Max Condensate Volume	l/h	19.0	28.5
pH Value Condensate Water		4 – 5.5	4 – 5.5
CO Emission	mg/kWh	<20	<20
NOx Emission	mg/kWh	<40	<40
Pressure at Flue Outlet	Pa	200	200
Min/Max Working Pressure	bar	0.5 – 6.0	0.5 – 6.0
Max Flow Temperature	°C	85	85
Power Supply	V	230	230
Power Consumption Min/Max	W	60/770	60/770
Water Content	L	72	91
Design Δt	°C	20	20
Weight Empty	kg	277	315
CE Product Indentification No.		CE-0085AR0462	

3.2 critical dimensions



Dimensions in millimetres

Fig 3.2a

Table 2

		Midimat HT-220	Midmat HT-330
Depth	A	1755	1755
Height	B	1430	1700
Width	C	628	628
Height to gas connection	D	1235	1515
Dimension	K	500	500
Gas Inlet Connection	O	1" BSP M	1 1/2" BSP M
Safety Valve Connection	E	1" BSP M	1 1/2" BSP M
Height to Flue Gas Connection	F	555	496
Flue Gas Connection Diameter	M	Ø DN150 *	Ø DN200 *
Height to Air Supply Connection	G	930	1310
Air Connection Diameter (used when room sealing the Boiler)	N	Ø DN100 **	Ø DN100 **
Dimension	H	150	250
Height to Condense Waste Outlet	I	170	175
Height to Flow/Return Connections	J	1270	1735
Spare Tapping	P	1" BSP M	1" BSP M
Flow Connection	L1	DN 40 PN6	DN 50 PN6
Return Connection	L2	DN 40 PN6	DN 50 PN6
Dimemsion to Air Supply Connection	R	575	575
Condense Waste Connection	S	DN 40	DN 40

* Female socket with M + 10mm ID
** Male spigot with N + 10mm OD

3.3 system guidance

The Midmat HT boilers are designed to operate on a flow to return temperature drop of 20K. Systems must be sealed and pressurised to operate within the range 0.5 bar to 5.3 bar.

3.4 flue options

The Midmat HT boiler may be used with either an open or room sealed flue/air system. Approximately 200Pa is available as residual flue pressure at the exit from the appliance. Full details regarding flue specification are given in section 4.3.

3.5 thermal performance – heat output limits

The Strata 3 – 220 can be limited to a maximum thermal loading between 42kW and 210kW.
The Strata 3 – 330 can be limited to a maximum thermal loading between 63kW and 316kW.

4.0 appliance *installation requirements*

4.1 statutory requirements

Gas Safety (Installation and Use) Regulations (Current Issue).

It is the law that all gas appliances are installed by a registered person, in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure that the law is complied with.

In addition to the above regulations, this appliance must be installed in accordance with the current IEE Wiring Regulations for electrical installation, (BS 7671), Local Building Regulations, the Building Standards (Scotland) (Consolidation) Regulations, Bye laws of the Local Water Undertaking and Health and Safety Document No.635 'The Electricity at Work Regulation 1989'.

It should also be in accordance with the relevant recommendations in the current editions of the following British Standards and Codes of Practice, plus any others that are relevant to the proposed installation: BS6644, BS6880, IGE/UP/2, IGE/UP/7, & IGE/UP/10.

Important Note: Manufacturer's instructions must NOT be taken in any way as overriding statutory obligations.

4.2 boiler position

The following considerations must be observed when siting the Midmat HT boiler:

The boiler is not suitable for external installation. The position selected for installation should be within the building, unless otherwise protected by a suitable enclosure, and MUST allow for adequate space for installation, servicing, operation, and for adequate air circulation around it. (Refer to fig 4.2a).

This position MUST allow for a suitable flue system and terminal position (Refer to section 4.3). A connection to a suitable termination point for the discharge of condensate must be available. If this is not present, a condensation pump with an elevation level of 5 metres (available from MHS) may be fitted to the appliance. TheMidmat HT – 220 and 330 must be installed on a flat horizontal floor capable of supporting the boiler and any ancillaries (circa 320kg for the 220 and 360kg for the 330).

In boiler plant rooms where there is a risk of air contamination as a result of halogenated hydrocarbons (eg contained in spray cans, solvents and cleaning agents, dyes, adhesives) or heavy dust deposits, the boiler must be provided with a room sealed air supply. (See figure 4.2a) for plant room clearances. If the Strata 3 is operated on a room air dependent basis in these (or similar) conditions, faults may arise. In this case, no guarantee claim will be accepted. The boiler room must be dry and frost free.

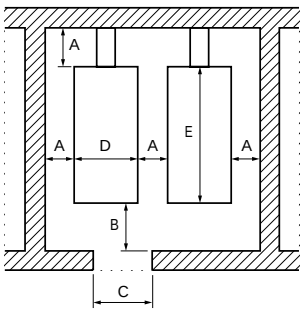


Fig 4.2a

boiler plant room

Dimensions & Clearances mm	Strata 3 220 & 330
A	500
B	1000
C	650
D	628
E	1755
Above Boiler Model 220	370
Above Boiler Model 330	600

4.3 flue *systems*

4.3 flue systems

Midmat HT boilers are fully condensing, fully modulating appliances and it is recommended that each boiler is flued independently, however, it is possible to connect multiple boiler flues together providing no part of the common flue pipe is horizontal. A suitable flue must be connected to the boiler and routed to discharge above the roof of the building.

Where it is required that the boiler should be room sealed, an air supply duct must be connected to the appliance to take air directly from outside the building via suitable fittings.

Under all circumstances, plant rooms must be ventilated in accordance with BS 6644:1991, ventilated for combustion air and cooling or cooling only dependent on flue type.

The combustion system includes a high pressure fan which is able to overcome a flue or a flue duct plus air duct total resistance of 200Pa.

Extended horizontal flue duct routes are possible but there must be at least a 3° fall on the flue duct back towards the boiler, to facilitate condensate removal. (3° = 5.0cm of fall per metre of duct).

Flue ducts must be gas and watertight and resistant to flue gas condensate and suitable for a working temperature of not less than 120°C. Flue termination position must meet the requirements of BS 6644:1991 and the Clean Air Act Memorandum on Chimney Heights.

Note: The Clean Air Act Memorandum prevents the use of balanced flue appliances discharging at low level where the total heat input to the plant room exceeds 150kW Gross.

4.4 ventilation requirements

Where the appliance is room sealed, use guidance given in BS 5440:2/2000 for ventilation provision. Where the appliance takes air for combustion from the boiler house, an adequate supply of fresh air for combustion and ventilation of the boiler house must be supplied in accordance with BS 6644:1991, or IGE/UP/10.

The air supply should be achieved using either:

a. Natural ventilation with low level and high level openings.

b. Using a fan to supply air to a low level opening with natural discharge through a high level opening.

c. Using a fan to supply air to a low level opening and a fan to extract air at a high level opening.

Where natural ventilation is used, suitable permanent openings connected directly to the outside air must be provided. The openings should be fitted with grilles that cannot be easily blocked or flooded or permit the entry of any foreign bodies.

The free area of the grilles should be as follows:-

Low Level (inlet) 540cm^2 plus 4.5cm^2 per kW in excess of 60kW Gross of total rated input.

High Level (outlet) 270cm^2 plus 2.25cm^2 per kW in excess of 60kW Gross of total rated input.

Note: Total rated input is the sum of the heat input of all gas appliances in the boiler room.

This guidance is taken from BS 6644:1991, alternative guidance is given in IGE/UP/10.

4.5 hydraulic system design

The Midmat HT boilers are designed to operate on a flow to return temperature drop of 20K (Δt 20°C). Systems must be sealed and pressurised and operate within the range 0.5 bar to 5.3 bar. The system design should incorporate a pressure gauge, visible from the filling point to indicate the system water pressure.

Table 3 - Boiler hydraulic resistance

Model	220	330
Design Flow Rate at 80/60 Flow/Return Temperatures	2.38 l/s	3.57 l/s
Hydraulic Resistance at 80/60 Flow/Return Temperatures	65.0 kPa	62.5 kPa
Design Flow Rate at 50/30 Flow/Return Temperatures	2.62 l/s	3.95 l/s
Hydraulic Resistance at 50/30 Flow/Return Temperatures	82.5 kPa	74.0 kPa

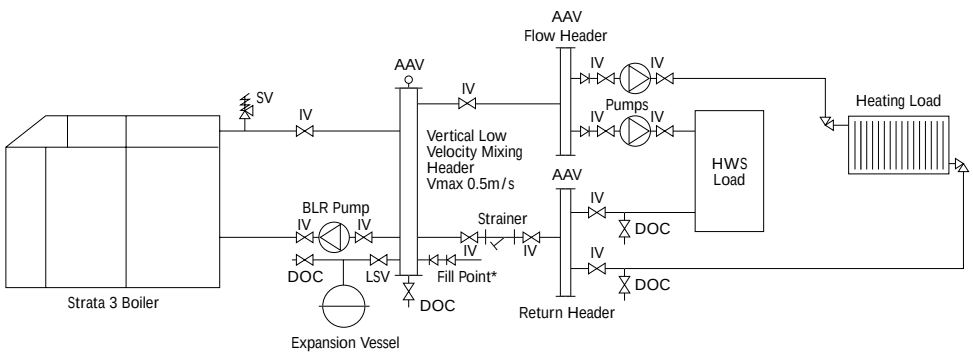
The Signal to start the boiler pump is provided by the boiler, and where the pump motor rating does not exceed 600 Watt 230V single phase, the pump may be driven directly from power available from the boiler inbuilt controls.

All systems must be thoroughly cleansed prior to the connection of the boiler. The system water should be treated to prevent general system corrosion and the deposition of scale or sludge in the boiler waterways. If installing the boiler onto an old system, it is recommended to install a spirotech or similar dirt arrester/filter. Failure to cleanse and water treat the system will render the appliance guarantee void.

If plastic pipes are used for the flow and return pipes, for radiators or under floor heating, a plate exchanger should be considered between the system water and the boiler water. If such a separator is not used, the MHS guarantee on all boiler parts will become null and void, unless it can be proved that the plastic pipes used have a vapour tight layer.

The connection of the flow and return are located at the top rear of the unit. With regard to servicing, it is a requirement that isolation valves are installed.

recommended system design
typical single Midmat HT boiler installation



* Fill Point. In accordance with BS6644, automatic pressurisation unit must be installed

Fig 4.5a

4.5 hydraulic system design (contd)

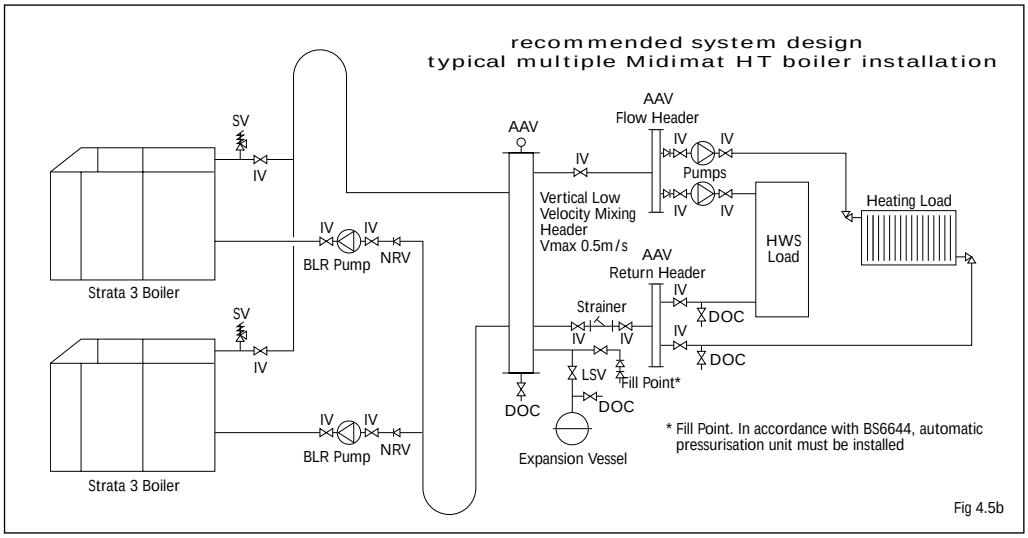


Fig 4.5b

Table 4 - Low velocity vertical mixing header diameter sizing guide

Boiler Power kW	Diameter based upon Δt 20°C
220	100mm
330	125mm
440	125mm
660	150mm
880	175mm
990	175mm
1100	200mm
1320	200mm
1650	225mm

Tube diameters refer to medium grade or large steel tubes and are calculated using data from CIBSE guide C4

4.6 filling the system

The initial filling of a sealed heating system, and subsequent refilling, must be by a method that has been approved by the Water Regulation Advisory Scheme (WRAS) for that type of heating system. ie. Non Domestic (Other than in-House) Fluid Category 4 (C-4). For Category 4 systems, the approved method of filling must comprise of the following components in the arrangement shown;

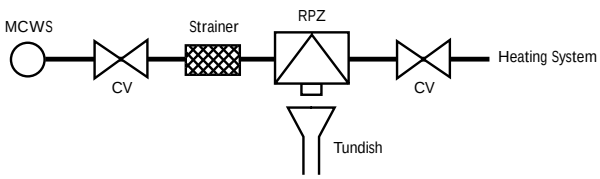
- Control valve
- Strainer
- Verifiable backflow device with reduced pressure zone (RPZ Valve). Incorporating a 'Type BA' air gap.
- Tundish
- Control valve

Further more, in accordance with BS6644, for boiler/s with an input greater than 60kW, an automatic pressurisation unit must be installed to automatically replenish any lost or evpourated water.

The pressurisation unit must comprise of the following components;

- A cistern fitted with a float operated valve incorporating either a 'Type AG' (C-3), or 'Type AF' (C-4) air gap.
- A presssure booster pump fitted with a single check valve
- A pressure reducing valve
- A pressure switch

For information on a comprehensive range of pressurisation units please contact MHS Sales.



4.7 gas supply

The Midmat HT boiler is designed and delivered ready for Natural Gas group G20. For operation with LPG. The LPG conversion kit must be ordered and installed and the multifunctional gas valve adjusted as necessary. (See section 5.4). The Gas Supplier should be consulted at the installation planning stage in order to establish the availability of an adequate supply of gas. An existing service pipe MUST NOT be used without prior consultation with the gas supplier. An existing meter and/or pipework should be of sufficient size to carry the maximum boiler input plus the demand of any other installed appliance. (BS 6891:1988).

The governor at the meter must give a constant outlet pressure of 20 mbar (8 in. wg) when the appliance is running on natural gas (G20) or 37 mbar at the regulator when using LPG (G31). The gas supply should be purged in accordance with IGE/UP/1. WARNING: Before purging open all doors and windows, also extinguish any cigarettes, pipes and any other naked lights.

4.8 electrical supply

A 240 Volt single phase supply must be present at the proposed boiler location. Wiring external to the appliance must be in accordance with BS 7671 (the current IEE Wiring Regulations) for electrical installation and any local regulations which apply.

Wire used for the outdoor sensor, the room unit and the domestic hot water temperature sensor must have the following minimum cross section, depending upon the cable length.

Table 5

Length m	Minimum Cross Section mm^2
Up to 25	0.25
25 ... 50	0.5
70 ... 140	1

The mains cable must be PVC insulated to BS 6500 table 16.

WARNING: THIS APPLIANCE MUST BE EARTHED. (Failure to provide a satisfactory Earth connection would be a safety hazard and may also result in appliance malfunction).

The method of connection to the mains supply must facilitate complete electrical isolation of the appliance. A fused double pole switch having a 3mm contact separation in both poles and serving only the boiler (and its external controls) may be used.

5.0 installation *instructions*

5.1 unpacking the boiler

The boiler is delivered in a fully paletted crate containing the boiler and associated fittings, plus any other optional ancillary control components in separate cartons.

The boiler crate contains:

- Midimat HT 220/330 boiler.
- Assembly, commissioning and maintenance manual.
- External temperature sensor with screws and plugs.

Built into each unit are the following:

- Siphon for condensation discharge integrated in exhaust gas collector.
- Flow temperature sensor.
- Thermometer with LCD display.
- Manometer with LCD display.
- SPIRANOX condensing heat exchanger in austentic (316L) stainless steel.
- ECONOX premix radiant burner, RPM-controlled.
- Gas control valve, gas/air pressure ratio 1:1.
- Boiler water temperature control.
- Fully automatic ignition.
- Ionisation monitoring.
- Weather-dependent (compensated) control.

5.1 unpacking the boiler (contd)

The unit must be inspected immediately after delivery. Any damage to the consignment must be reported within 3 days.

Firstly move the packaged appliance to the desired location. To unpack the boiler, carefully remove the outer crate and cut away the outer packaging. By holding the steel base only, lift the boiler and remove the palette.

5.2 positioning the boiler

The appliance should be moved to the desired location prior to unpacking, making sure that all clearance dimensions as stated in section 4.2 are adhered to.

Level the appliance in a horizontal position by turning the adjustable feet underneath the base of the unit. Check that the appliance is in a true horizontal position by using a spirit level.

Once the appliance is in a true horizontal position, the adjustable feet must be secured by the locking nuts.

5.3 gas connection

The gas connection is located on the upper left hand side of the appliance (viewed from the front) (see section 3.2). The gas supply should be sized, installed, tested and purged in accordance with IGE/UP/1&2.

The connection to the appliance must include a suitable method of disconnection and a gas control cock must be installed adjacent to the appliance for isolation purposes.

The gas pipe used to supply the appliance must not allow a pressure drop of greater than 1 mbar from the meter to the appliance. The nominal inlet working gas pressure measured at the appliance should be 20.0 mbar for natural gas (G20) or 37 mbar (G31) for propane (LPG). The installer should install a pressure test point adjacent to the gas inlet connection.

The gas supply line should be purged in accordance with IGE/UP/1. WARNING: Before purging open all doors and windows, also extinguish any cigarettes, pipes and any other naked lights.

5.4 LPG conversion instructions

The Midimat is supplied suitable for use with natural gas. For conversion to LPG, the natural gas injector must be replaced with the LPG injector (accessed from inside the air inlet duct). The LPG injector is included in the LPG conversion kit, part No. 96.00044-0404.

Injector Size	220	330
Natural Gas (G20)	10.8mmØ	13.0mmØ
L.P.G (G31)	7.5mmØ	9.7mmØ

The low pressure gas cut off switch will need to be adjusted from approx. 15mbar (G20) to approx. 27 mbar (G31).

5.5 water connections

Midimat boilers must only be installed on sealed and pressurised systems. All systems must be thoroughly cleansed prior to the connection of the boiler. The system water must be treated to prevent general system corrosion and the deposition of scale or sludge in the boiler waterways. If installing the boiler onto an old system, it is recommended to install a diamante, spirotech or similar dirt arrester/filter.

See section 4.5 for water treatment product stockists. The central heating flow and return connections are flanged fittings – DN40 PN6 for the M 220 and DN50 PN6 for the Midimat 330. The flow and return connections are located at the upper rear of the appliance.

A suitable safety valve must be installed onto the boiler flow pipe between the boiler and any isolation valve. The boiler flow and return pipes must include a method of disconnection and must include isolation valves.

5.6 condensate waste connections

The condensate waste connection is located at the lower rear of the appliance. During the operation of the boiler , because of the low exhaust gas temperatures in both the heating boiler itself and in the exhaust gas system, a slightly acidic condensation water (pH value between 3.5 and 5) is deposited.

The condensate waste connection is a 40mm plastic tube located at the rear of the appliance. Only plastic components must be used for the condensation discharge. Metal pipes are not acceptable due to the acidic nature of the condensate.

The built in siphon allows the unit to be connected directly to a drain system. A level control device is built into the siphon. In the event of a blockage in the condensate line, the burner is automatically switched off before any damage is done to the appliance.

The siphon drain point is located behind the rear casing panel, next to the condensate water connection. This must be opened annually in order to flush the condense system and to remove any debris.

If any part of the condensate waste pipe is to be run external to the building or is at risk of freezing, then the pipe must be suitably insulated to protect it from freezing.

If a suitable drain for accepting the condensate waste is not available nearby to, and below the boiler (e.g. if the boiler is installed in a basement below ground level), an (optional extra) condensate receptacle and pump (available from MHS) can be installed adjacent to the appliance. This will collect and remove condensate to a remote drain up to 5 metres height above the receptacle position. Note that blockage of the waste discharge will cause the unit to switch off by means of a built in level control device.

It is recommended that the condensate waste pipework should include a method of disconnection and cleaning points.

5.7 electrical connections – general

To remove the control panel:-

- Unfasten the screw which secures the front panel.
- Pull the panel out and away from the appliance.
- From inside the casing, remove the 2 fixing screws on the underside, upper return edge of the 2 side panels.
- Slide the entire control panel/box away from the appliance.
- Hang the panel, using the turned up brackets, on to the appliance cross member for easy access.

Note: All electrical connection cables must be fed through from the rear of the boiler. Do not pass cables through or fix to the casing panels.

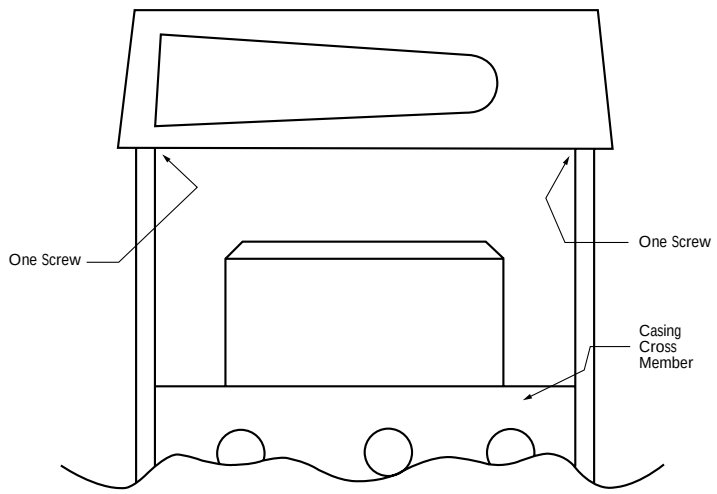
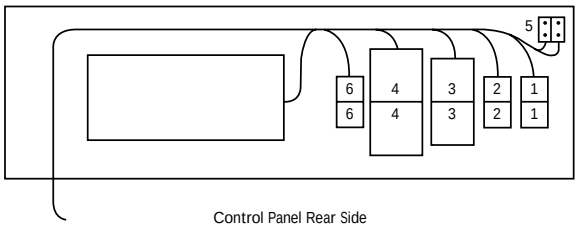


Fig 5.7a

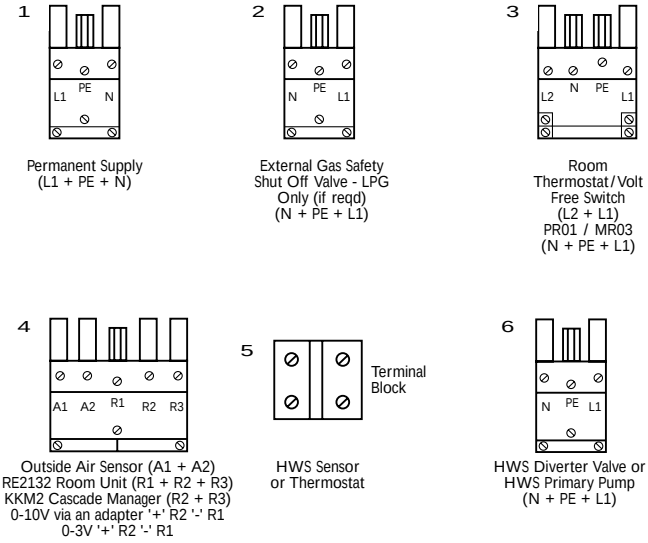
5.7 electrical connections – general (contd)

location of electrical points



Control Panel Rear Side

weiland plug / socket functions



Permanent Supply
(L1 + PE + N)

External Gas Safety
Shut Off Valve - LPG
Only (if reqd)
(N + PE + L1)

Room
Thermostat/Volt
Free Switch
(L2 + L1)
PR01 / MR03
(N + PE + L1)

Outside Air Sensor (A1 + A2)
RE2132 Room Unit (R1 + R2 + R3)
KKM2 Cascade Manager (R2 + R3)
0-10V via an adapter '+' R2 '-' R1
0-3V '+' R2 '-' R1

Terminal
Block

HWS Sensor
or Thermostat

HWS Diverter Valve or
HWS Primary Pump
(N + PE + L1)

Fig 5.7b

5.7.1 connecting power supply

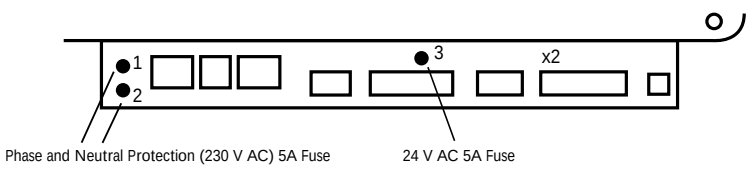
The mains electrical connection on the Midimat is made via plus No (1) (see fig 5.7b) with a conductor cross section of 3 x 1.5mm^2.

Wire used for the outdoor sensor, the room unit and the domestic hot water temperature sensor must have the minimum cross section, depending upon the cable length stated in table 5, section 4.7.

5.7.2 fuses

The Midimat boilers have 3 electrical fuses in the boiler control panel. (fig 5.7b).

location of fuses



Phase and Neutral Protection (230 V AC) 5A Fuse

24 V AC 5A Fuse

Fig 5.7c

5.7.2 fuses (contd)

Fuses 1 and 2 protect the power supply phase and neutral. Fuse 3 protects the entire 24V AC circuit. The 24V AC power supply is rectified in the boiler control panel and controls the fan and supplies the room unit(s) with voltage. The supply voltage of the sensors is not accessibly fused in the boiler control panel. This applies also for the protection of the ignition transformer. In the case of a fault in these areas, the boiler control panel must be replaced.

5.7.3 connecting a boiler (transport) pump

It is recommended that the boiler pump be electrically connected to the boiler. The pump will start as dictated by the boiler, will overrun when necessary and will run when commanded by the boiler's own frost protection programme.

The signal to start the pump is provided via plug x 33 and where the pump motor does not exceed 600 watts, 230V 1 phase, the pump may be driven directly from power available from the boiler inbuilt controls, plug x 33 is located on a flying lead and may be found in the top area of the boiler approximately half way along the length of the boiler. Where the pump motor exceeds 600watts an auxillary relay must be used.

5.7.4 external temperature sensor

Where weather variable/direct on boiler weather compensation control is required, the external temperature sensor must be installed. The external sensor should be mounted on the North or Northeast side of the buildings, at approximately 2/3 of façade height.

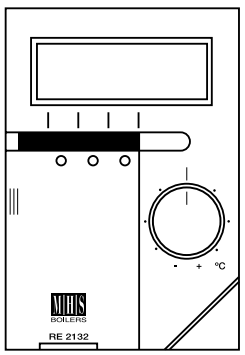
The external temperature sensor should not be mounted above windows or below eaves. Under no circumstances may the sensor be exposed to direct sunlight. The external temperature sensor should be connected via two cores on plug No 4 – see fig 5.7b.

5.7.5 room unit RE 2132

Where room temperature influence, or remote adjustment is required, a room unit will need to be installed. This is available as an additional accessory (see fig 5.7d).

If the room temperature sensor of the room unit is used, no thermostat/radiator/convector valves should be installed in the room with the room unit.

The room unit must not be directly influenced by insulation or heat sources, such as heat emitters or direct sunlight. The room unit should be connected via three cores on plug No 4 – see fig 5.7b.



Remote tamper proof temperature sensors are available to allow the controller to be installed in a non heated area Sensor ID = QAW44

Fig 5.7d

5.7.6 external on/off control

Where this is required a 230V AC volt-free contact must be installed. With the contact open, the boiler control is switched to the frost protection function, whilst with the contact closed, depending on the DIP switch configuration of the boiler control, the boiler will operate.

The external on/off control should be connected via two cores on plug (3), terminals L1 and L2, fig 5.7b. Only one of the aforementioned control systems can be utilised at one time.

Other types of cascade controllers with a continuous 0 to 3V, or 0 to 10V signal can also be connected. An optional adapter is required, for 0 to 10V. See Fig 5.7e (Below)

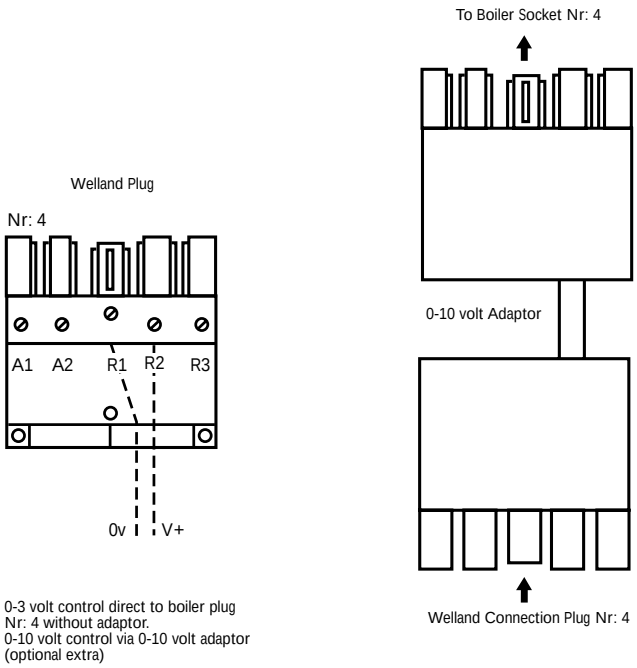


Fig 5.7e

5.7.7 cascade controller KKM2

The KKM2 Cascade Manager is available as an accessory (see fig 5.7f). The cascade controller can operate up to 5 units. On a load dependant basis, it controls the modulation of the burners, and the switching of the appliance(s). It includes all necessary sensors and an external temperature control which adjusts the flow temperature of the cascade system as a function of the outside air temperature and/or the sensed room temperature via the RE 2132 (if required) or 0-3 or 0-10v input. The KKM2 may also be set to give a constant flow temperature and can also control a domestic hot water circuit.

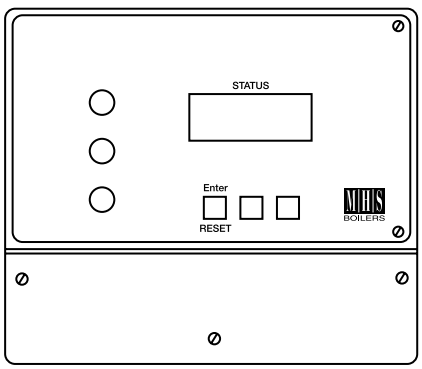
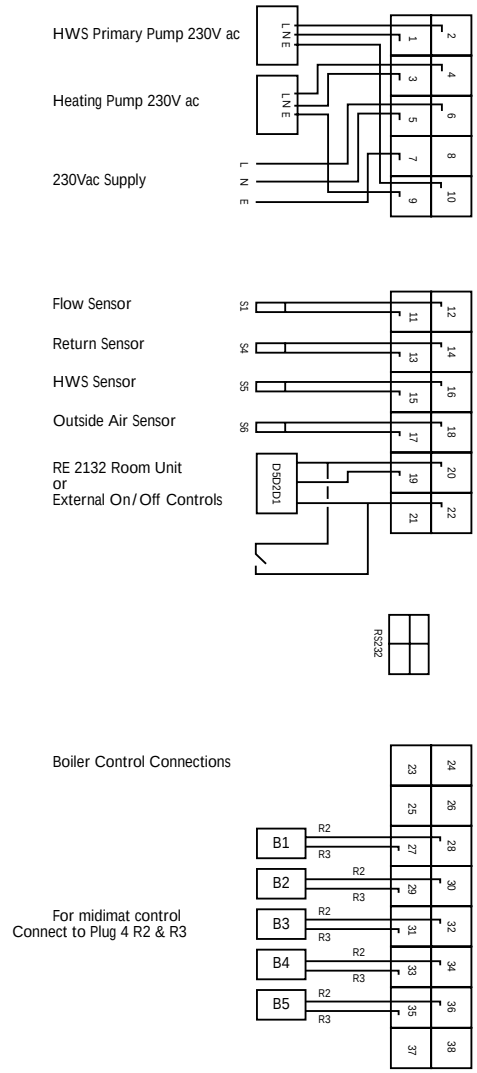


Fig 5.7f

5.7.7 cascade controller KKM2 (contd)

KKM2 sequence controller wiring details



Further information can be found in the operating manual of the KKM cascade manager.

Fig 5.7g

5.7.8 domestic hot water temperature sensor (TF) (if required)

For domestic hot water priority, a KTY 81-210 sensor or a volt free contact thermostat can be used. Connections are provided at connector No 5 – see fig 5.7b.

5.7.9 LPG operation

For use with LPG, an external gas solenoid valve (if required) may be installed in the gas supply line outside the building. This interrupts the gas distribution if there is no heat demand or a fault. Connections for an external solenoid (if required) are provided at plug No 2 – see fig 5.7b.

5.7.10 connecting the DHW primary pump (if required)

A domestic hot water primary pump can be connected directly to the boiler. The connection should be made via a 3 core cable to plug No 6 – see fig 5.7b. Max load 2A. Where the pump motor exceeds 2Amps a proprietry relay must be used.

5.7.11 circuit diagram

circuit diagram Strata 3 220/330

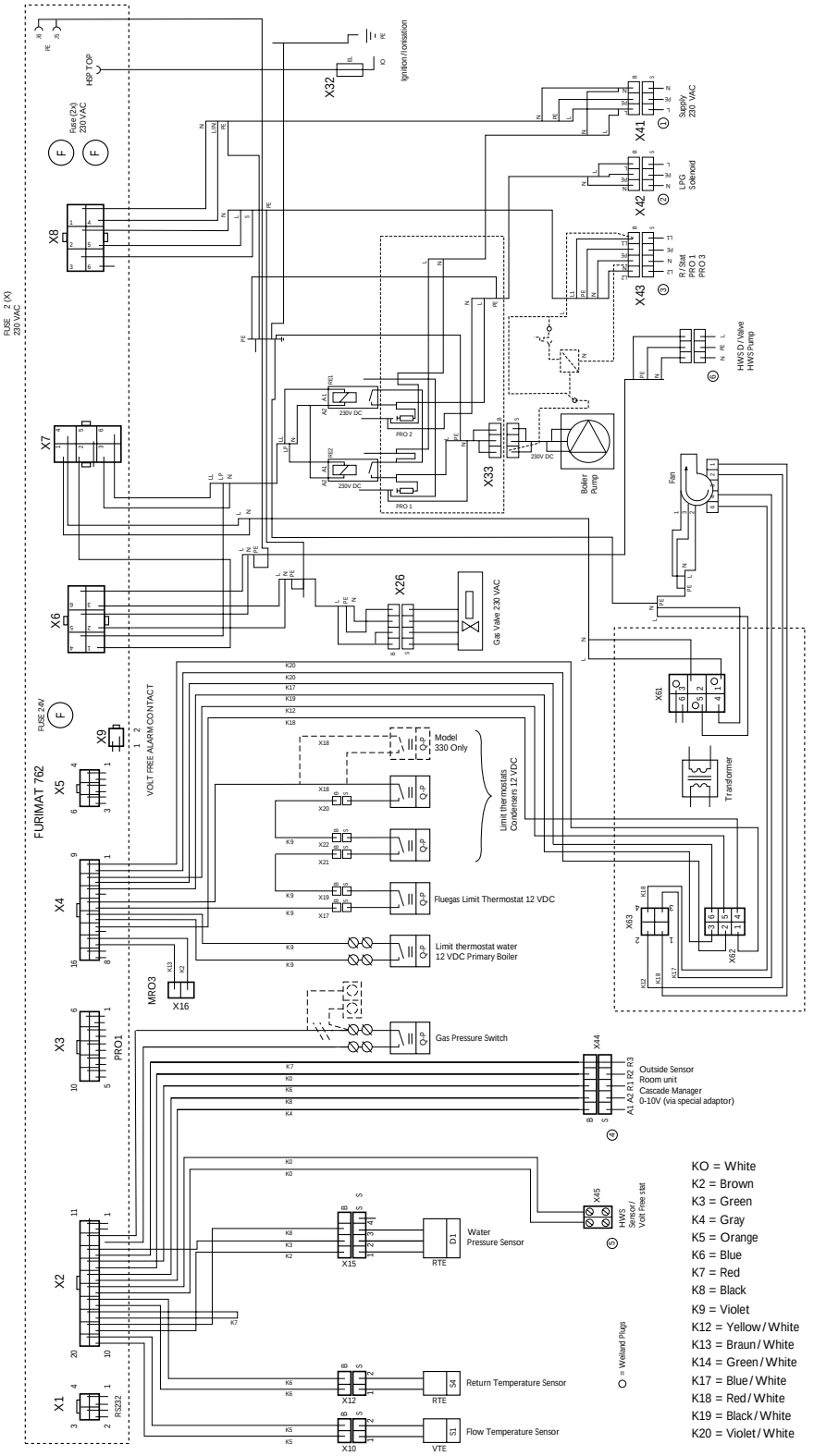


Fig 5.7h

5.8 Add on Modules

5.8.1 Pump module PR 01

The PR 01 pump control serves to control an additional heating circuit pump (pump 2).

Technical Information

- Supply Voltage – 230V 50Hz (mains from Strata 3 appliance)
- Maximum contact load – 2A
- Maximum contact rating – 120W

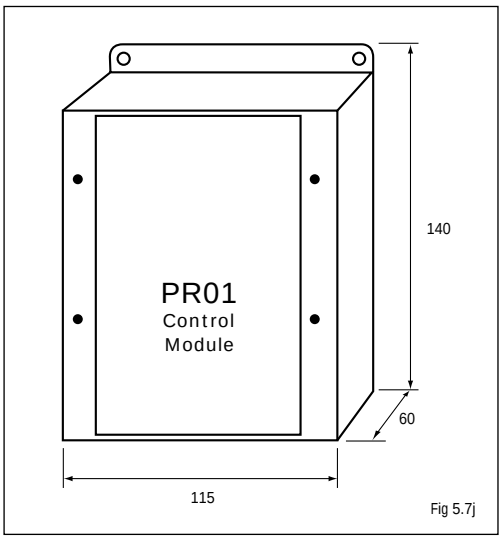


Fig 5.7j

Mounting

- Remove the 4 screws on the front of the pump control.
- Remove the cover.
- Mount the unit in the space provided inside the boiler casing.
- Refer to the instructions supplied with the unit.

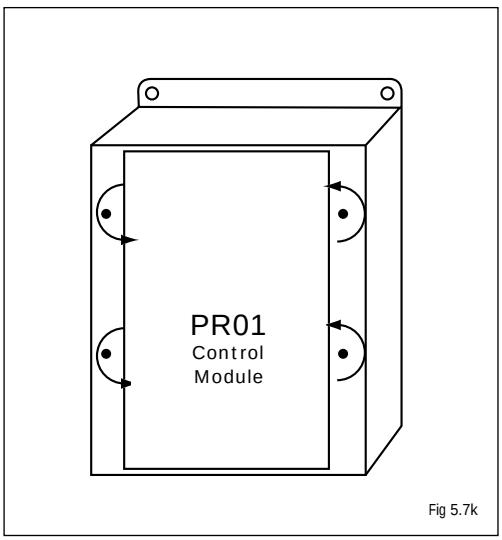


Fig 5.7k

NOTE: The DIP switch of the Strata 3 must be adjusted so that only one direct heating circuit is controlled (DIP 1 = OFF).

If the power consumption of pump 2 is more than 120W, an auxiliary relay is to be installed.

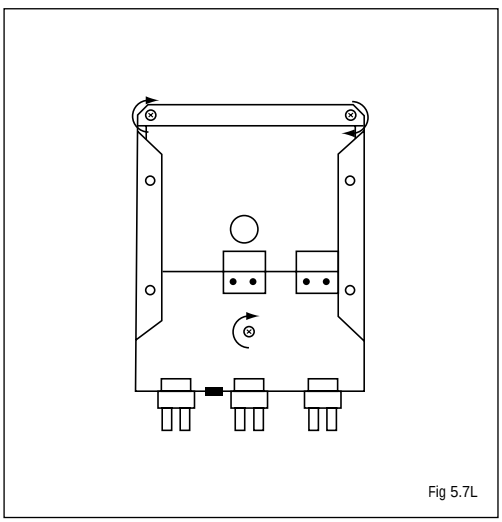
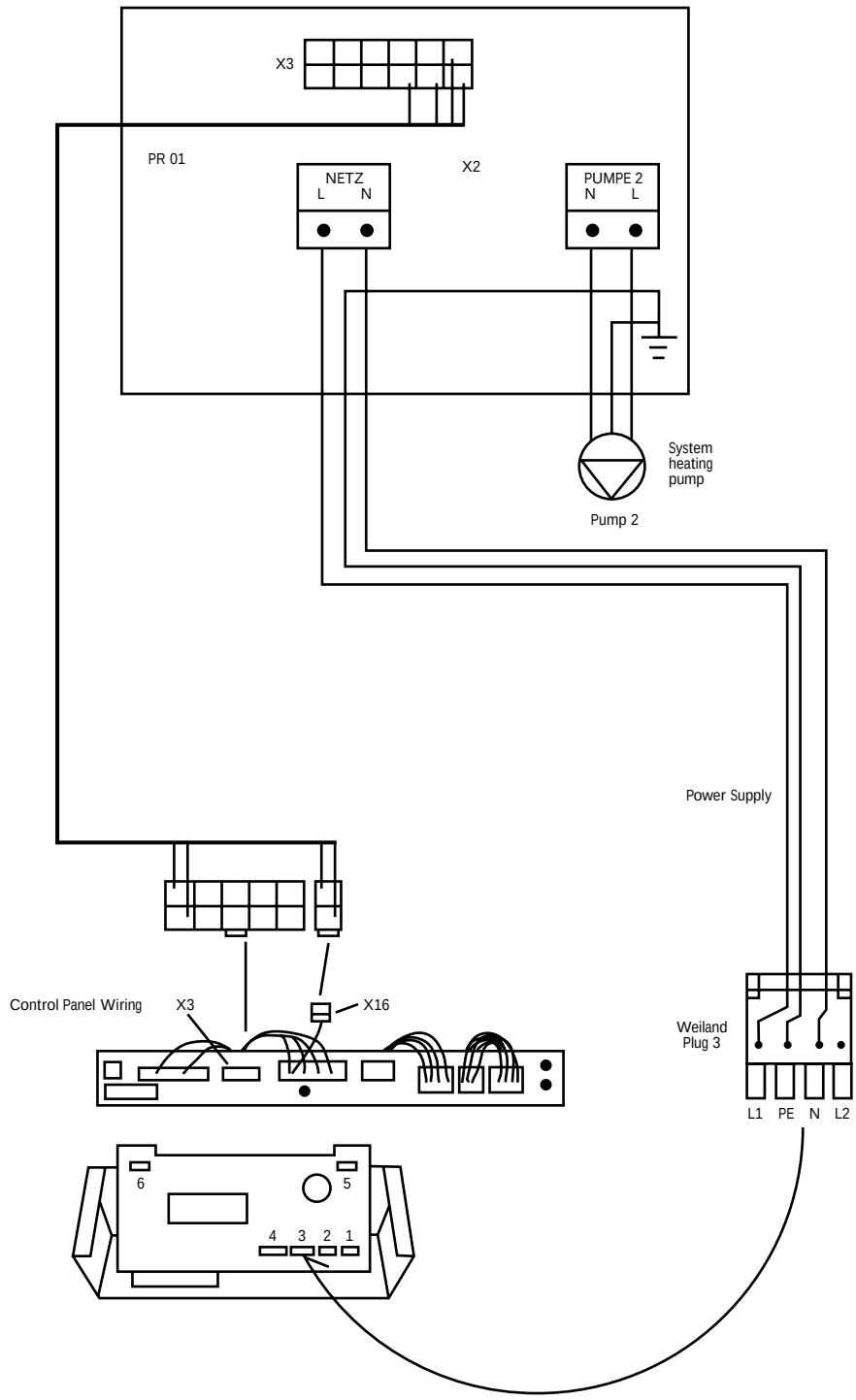


Fig 5.7L

5.8.1 Pump module PR 01 (contd)



Cable sets are supplied, labeled, and approximately 140cm in length

Fig 5.8a

5.8.2 mixer module MR 03

The mixer module MR 03 is used if a standard heating circuit (eg for normal temperatures for radiators) and a mixed heating circuit (eg for under floor heating 55/45°C) with different flow temperatures are connected to the Strata 3. The mixer module MR 03 is intended for mounting inside the boiler casing, and contains a potentiometer for setting the heating compensation slope for the underfloor circuit.

Technical Information

- Supply Voltage – 230V 50Hz (mains from Strata 3 appliance)
- Maximum contact load (pump 2) – 1.0A
- Maximum contact rating (pump 2) – 120W
- Maximum contact load (pump 3) – 1.0A
- Maximum contact rating (pump 3) – 120W
- Supply temperature sensor S7: Type KTY 81-210 (PTC)

NOTE:

Ancillary relays required if pump duties are greater than detailed above.

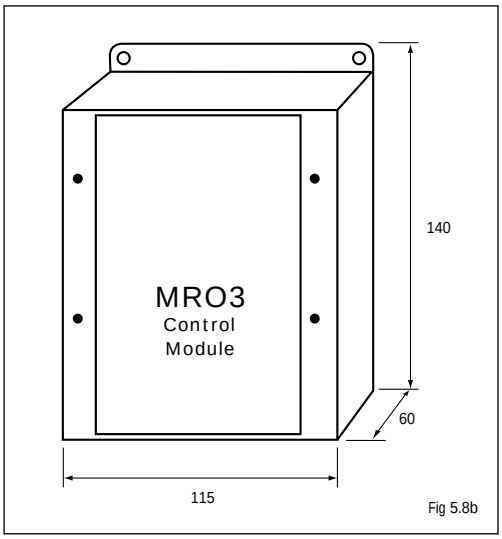


Fig 5.8b

Mounting

- Remove the 4 screws on the front of the pump control.
- Remove the cover.
- Mount the unit in the space provided inside the boiler casing.
- Refer to the instructions supplied with the unit.

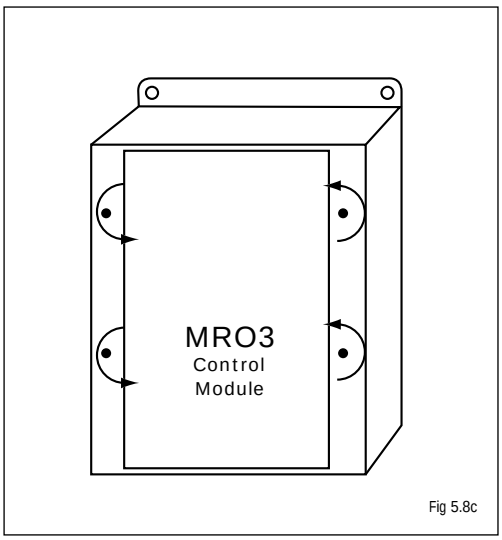


Fig 5.8c

NOTE: The DIP switch of the Strata 3 must be adjusted so that only one direct heating circuit is controlled (DIP 1 = ON).

If the power consumption of pump 2 is more than 120W, an auxiliary relay is to be installed.

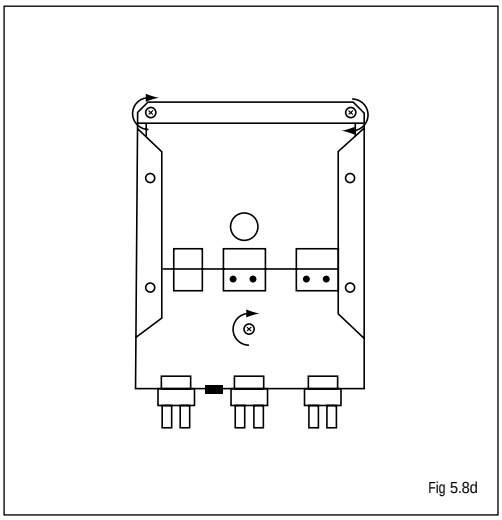
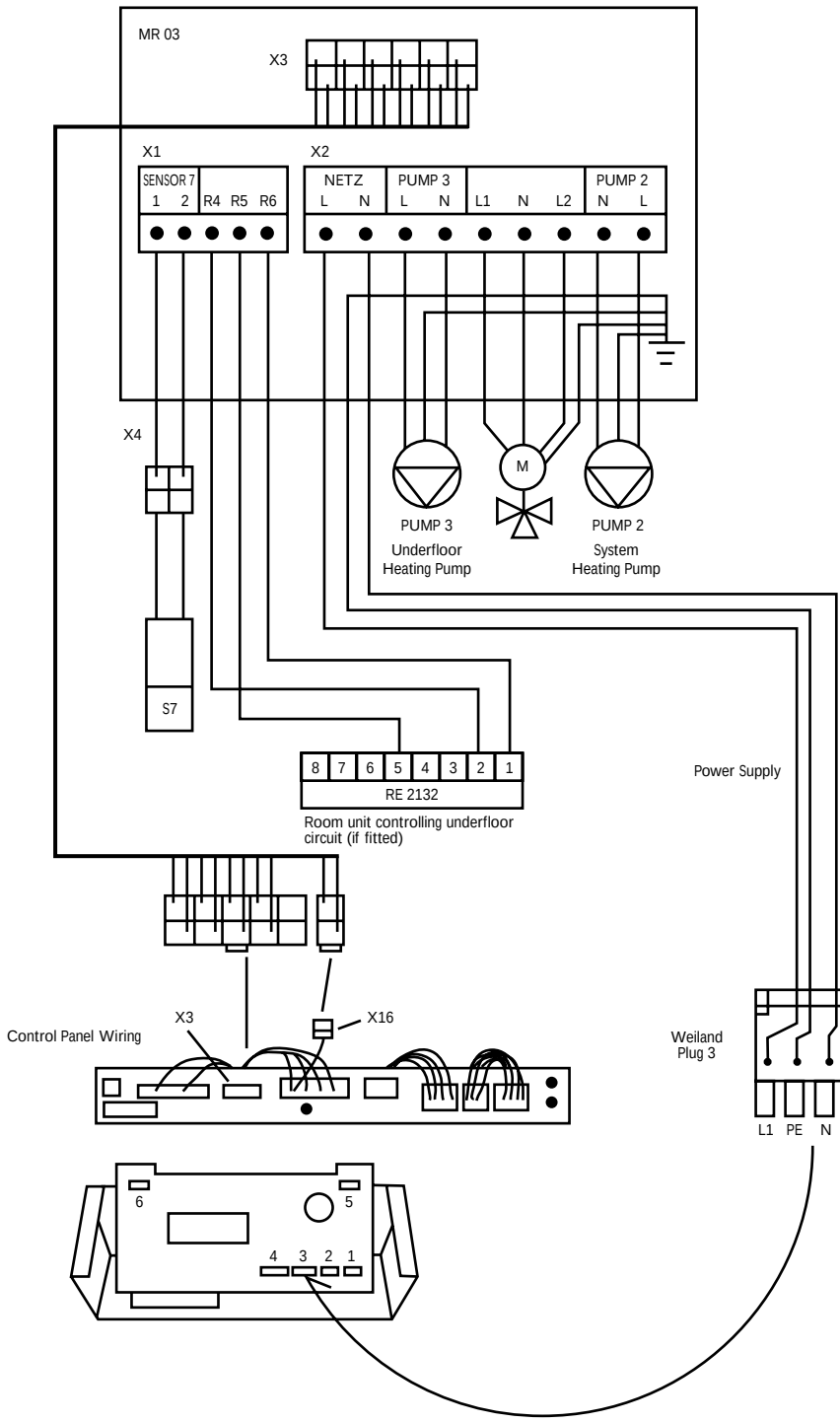


Fig 5.8d

5.8.2 installation and elect connection – MR 03

The MR 03 must be connected in accordance with the schematic diagram – fig 5.8e.



Pump 2 = Radiator Circuit
Pump 3 = Underfloor Circuit
M = Underfloor mixing valve
S7 = Underfloor circuit mixed flow temperature sensor

Fig 5.8e

5.8.2 installation and elect connection – MR 03

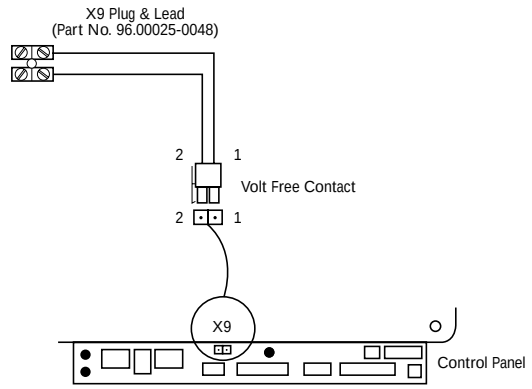
There are 3 options for room temperature:-

- Both circuits, weather variable, without room control influence.
- Room control influence with one room controller for the entire building – must be electrically connected direct to the boiler. Weiland Plug 4.
- Independent room influence control with 2 room units (one for the radiator circuit – connected directly to the boiler (Weiland plug 4) and a second room unit for the underfloor circuit connected to the MR 03 unit).

See section 5.7.5 – Room Unit RE 2132. DIP switch No 1 on the boiler control panel should be set to ON. If the respective power consumption of pumps 2 and 3 are more than 120W, auxiliary relays (auxiliary contactors) must be installed.

5.8.3 alarm contacts for common fault indication

TheMidimat has a volt free contact, which closes in the case of a fault. This fault contact can be applied with 230V AC and a maximum of 1A, via an adapter (X9) see fig 5.8f. X9 plug & lead assembly available from RVR Spare Parts Department.



This contact can be used to trigger an audible or an optical alarm signal in the case of a fault.

Fig 5.8f

Table 5 - Sensor temperature versus resistance table

Temperature °C	Resistance Ω	Voltage* V Over S1,S4, S5, S7	Voltage* V Over S6, AF
-30	1247	—	1,92
-25	1306	—	1,98
-20	1367	—	2,03
-15	1430	—	2,08
-10	1495	—	2,14
-5	1561	—	2,19
0	1630	1,88	2,24
5	1700	1,93	2,30
10	1772	1,98	2,35
15	1846	2,03	2,40
20	1922	2,08	2,45
25	2000	2,13	2,50
30	2080	2,18	2,55
35	2161	2,22	2,60
40	2245	2,27	—
45	2330	2,32	—
50	2417	2,36	—
55	2506	2,41	—
60	2597	2,45	—
65	2690	2,50	—
70	2785	2,54	—
75	2881	2,58	—
80	2980	2,62	—
85	3080	2,66	—
90	3182	2,70	—
95	3286	2,74	—
100	3392	2,78	—

* Measured between both contacts in operation (Sensors are at zero potential against earth)

S1 Flow Temperature Sensor
S4 Return Temperature Sensor
S5 Domestic Hot Water Temperature Sensor
S6 Outside Temperature Sensor (KKM2)
S7 MR03 Mixed Flow Sensor
AF Outside Temperature Sensor (Boiler)

6.0 commissioning *& testing*

The Midimat should be commissioned by a competent engineer. Before commissioning the appliance, the whole gas installation including the meter MUST be purged and tested for gas soundness in accordance with IGE/UP/1.

Caution: Open all doors and windows, extinguish naked lights and DO NOT SMOKE whilst purging the gas line.

The entire water system must be thoroughly cleansed and flushed to remove debris, flux residues etc before opening the boiler isolation valves and filling the boiler. Particular care must be taken where the appliance is being retro-fitted into an old/existing system, as system silt or magenite can be very damaging to the new boiler.

Following cleansing and flushing, the system must be dosed with a good quality water treatment to prevent corrosion and the formation of scale. Failure to observe these requirements will render the guarantee on the product void. Cleansing, flushing and water treatment must be carried out in accordance with the requirements of BS 7593:1992.

The return pipework must include some method of filtering or straining. The filter or strainer must be fitted with isolation valves to allow easy cleaning with the minimum amount of water loss and water replenishment.

Note: A low water pressure switch is included in the boiler and interlocked to shut the boiler down in the event of the water pressure falling below 0.5 bar.

Note: TheMidimat boiler has heat exchangers fabricated from 316L stainless steel. It is most important that the compatibility of any flux is checked with the flux supplier before use, and that any flux manufacturers recommendations are strictly followed with regards to use in conjunction with stainless steel.

6.1 filling the boiler

TheMidimat must be filled by a competent person using one of the approved methods in BS 6644:1991. Fill the installation to the system design cold fill pressure and vent the boiler via the air release valve on the boiler primary heat exchanger. See section 4.6 'filling the system' for guidance.

6.2 appliance operation

The start of operation of theMidimat heating boiler should commence only after the following points have been checked:

Flue system

- Check that the flue system is correctly assembled.
- Ensure that the connections for the condensate drain are water tight and the condensate can be freely drained.

Electrical connections

- ON/OFF switch set to OFF.
- Check the polarity of the power supply.

Water

Check that the setting of the safety valve is correct. Max boiler operating pressure 6 bar.

System controls

- Set all system controls to the required set points.

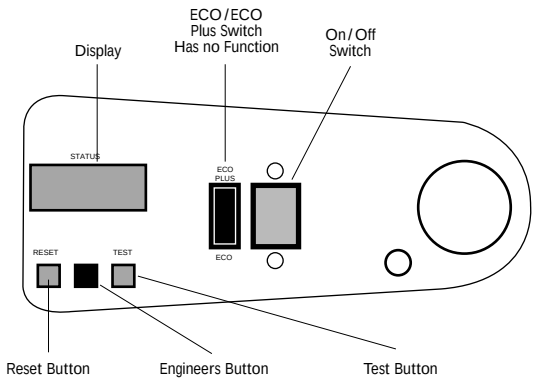


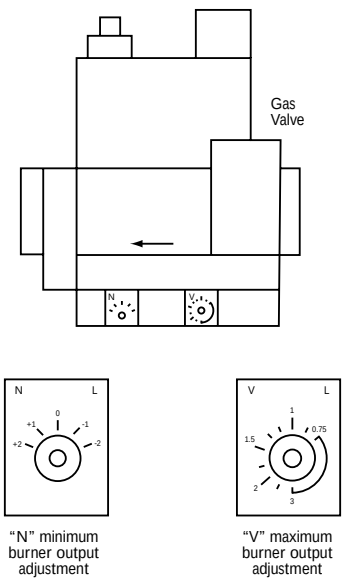
Fig 6.3a

6.3 initial lighting/commissioning

TheMidimat must be regulated with regard to the CO_2 content in the flue gas.

Note: Regulation via the burner pressure is not possible.

gas valve adjustment



"N" minimum burner output adjustment

"V" maximum burner output adjustment

Fig 6.3b

6.3 initial lighting/commissioning (contd)

Turn on the appliance ON/OFF switch

TheMidimat begins with a two minute de-aeration program. After this 2 minute program the appliance will start. If the Strata 3 does not start up and the message IGNITION FAILED is flashing on the status indicator on the display panel, press the red re-set button to allow up to four further automatic ignition attempts.

If ignition is still not established:

- Ensure the gas supply is correctly purged of air.
- Slightly increase the setting of the minimum burner output adjustment (a) and then press the red re-set button.
- Approximately one minute after ignition, turn the green potentiometer on the boiler control panel to setting '60'.
- Press the 'Engineers' button twice.

The status indicator shows 10 MIN LOW. The Strata 3 will now work for 10 minutes in commissioning/testmode.

- Turn the green potentiometer to the left to 20°C: this corresponds to maximum output.
- Measure the CO_2 value directly for maximum output by analysing flue gas in the flue system.

Refer to table 6 below:

Table 6

Type of Gas	Natural Gas G20	LPG G31
Injector Diameter (mm)	220 10.8mm 330 13.0mm	220 7.5mm 330 9.7mm
Minimum Output CO_2 %	7.8 - 8.4	10.0 - 10.6
Maximum Output CO_2 %	8.9 - 9.4	10.9 - 11.4

Note: Function of adjustment screw for maximum output ("V")

Setting a higher figure increases output

Setting a lower figure reduces output

- Turn the green potentiometer to 60°C (minimum output) and then check/adjust combustion to obtain value as shown in table 11.

Note: Function of adjustment screw for minimum output ("N")

Turning adjustment towards '+' figures increases output.

Turning adjustment towards '-' figures reduces output.

- Now turn the green potentiometer again to the left to 20°C (maximum output). Check again the CO_2 value for maximum output.
- Correct the value, if required, with the maximum output screw ("V").
- Press the 'Engineers' button once. The Strata 3 switches back into automatic operation.

Note: After ten minutes in test mode, the Strata 3 automatically returns itself to automatic operation.

6.4 potentiometer adjustments

6.4.1 limiting the output for heating operation

The nominal heat output for the boiler can be limited if required to any value between 42kW and 210kW for the Midimat 220 and between 63kW and 316kW for the Strata 3 330. The maximum output continues to be available for domestic hot water production.

To adjust the limit:

- Press the red 'reset' button. On the lower line in the display, the flow temperature T1 of the sensor S1 is displayed.
- Press the 'service button'.
- For the limit to be adjusted the red potentiometer must be turned. The display shows the old value to the left and the new value to the right (– – means: max output).
- By pressing the 'service button' again, the new value is stored.

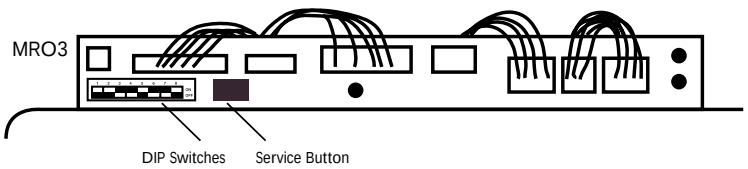


Fig 6.3c

6.4.2 setting weather compensation

- If direct-on-boiler weather compensated flow temperatures are required, then ensure the (supplied) outside air temperature sensor has been installed and DIP switch No 2 has been set to 'on'
- The boiler is supplied with the compensation slope shown (fig 6.4a) set as default.

Note: The default slope is obtained when the red and blue potentiometers are set in the vertical position.

- If the default settings are not applicable to the needs of the system user, then the angle of the slope may be changed by adjustment of either the blue or red potentiometers, or both.

Adjustment of the red potentiometer raises or lowers the flow temperature at low outside (design) (-1°C) air temperature. Adjustment of the blue potentiometer raises or lowers the flow temperature at the end point (high) (20°C) outside air temperature. Each potentiometer has the range of +20°C and -20°C about the default point but with a limiting factor that the maximum flow temperature is 85°C.

See graphs following which show the range of parallel displacement of the compensation slopes.

6.4.2 setting weather compensation (contd)

default compensation slope

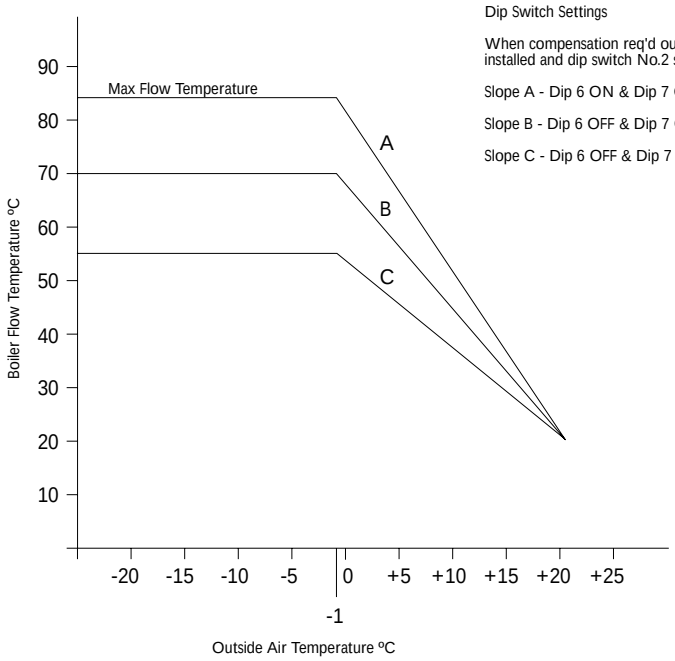


Fig 6.4a

range of parallel displacement of slope A

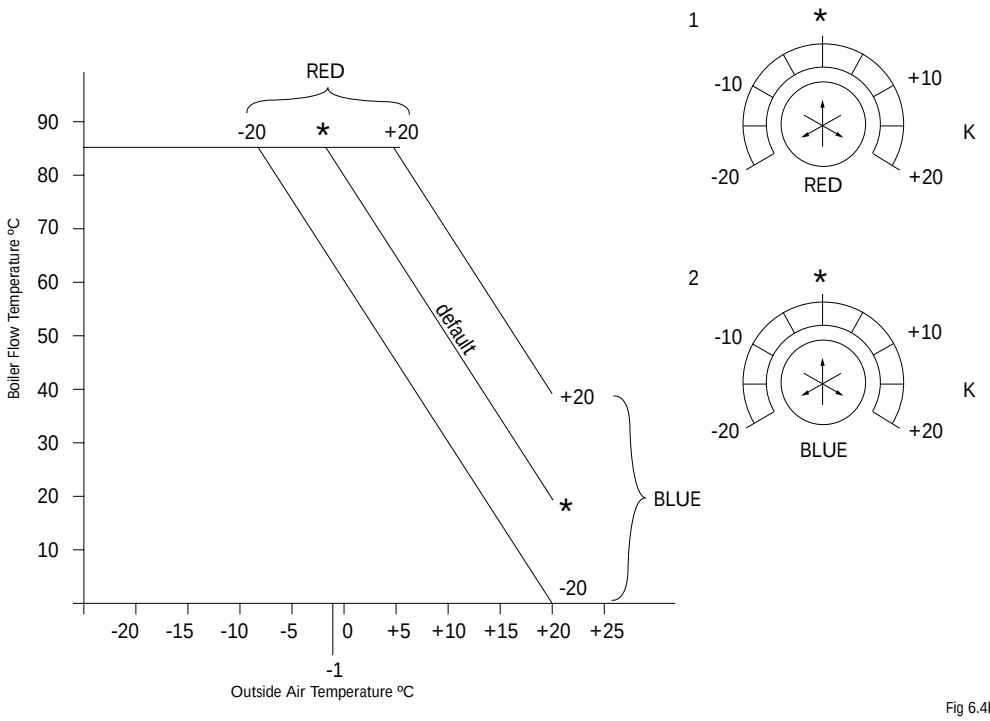


Fig 6.4b

6.4.2 setting weather compensation (contd)

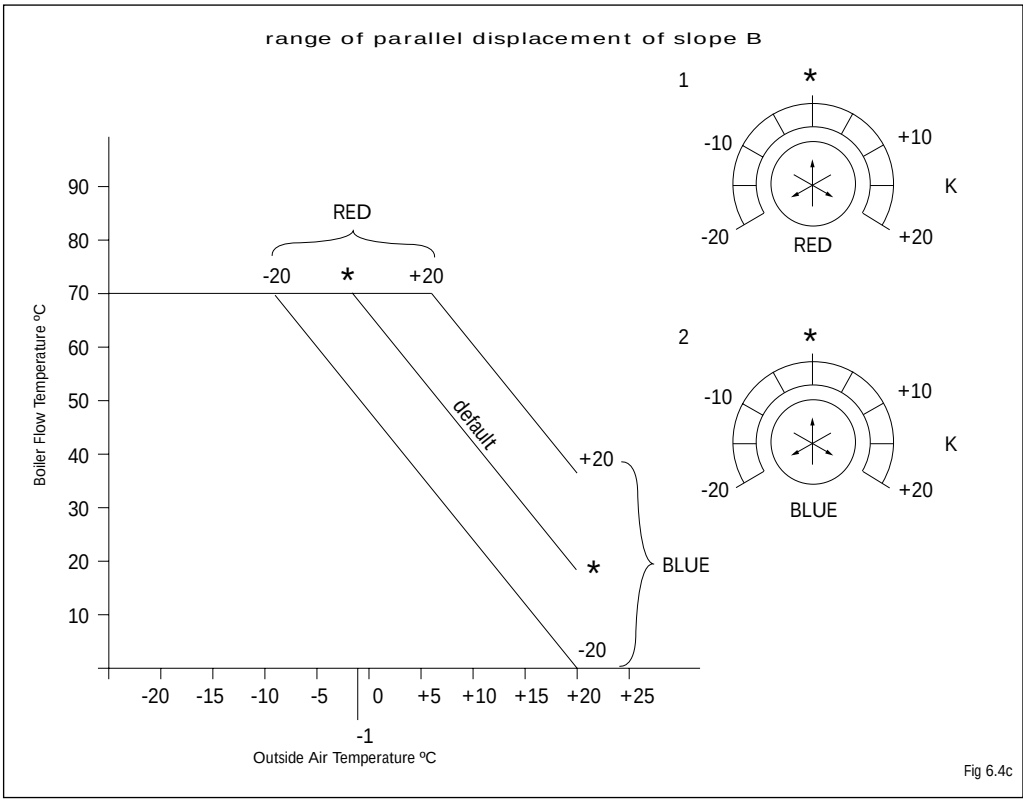


Fig 6.4c

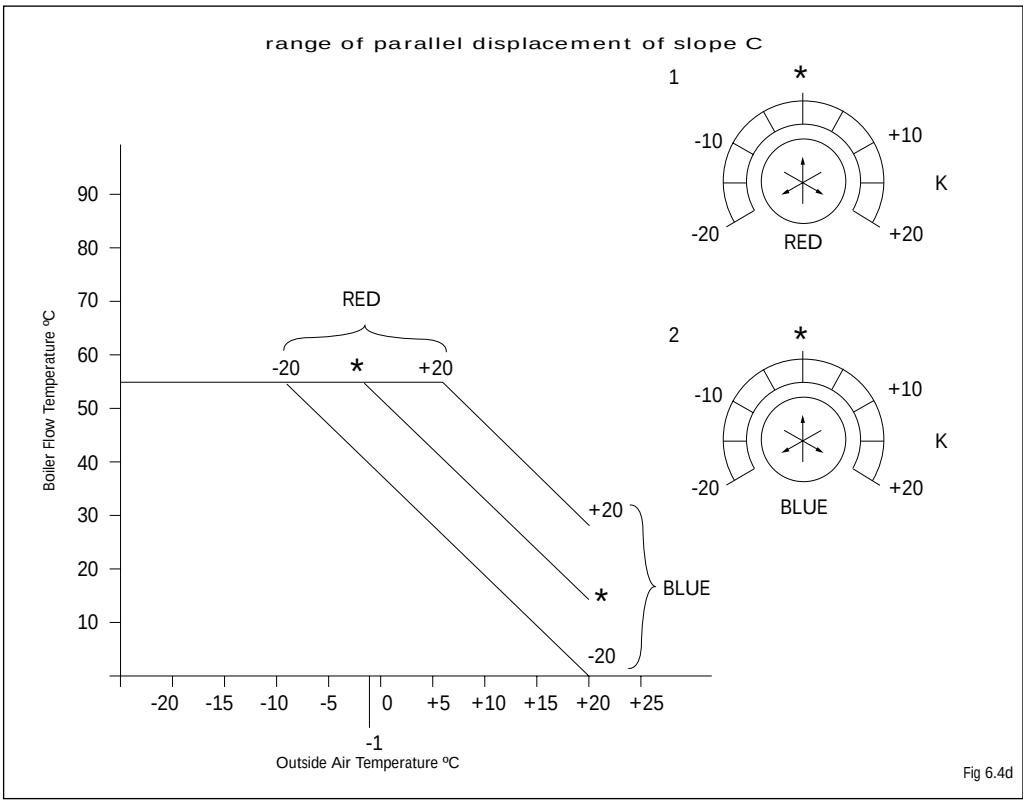


Fig 6.4d

6.4.3 adjusting the fixed point of the mixer circuit

If the MR 03 mixer control is connected to the Strata 3, the fixed point of the heating curve of the mixer can be adjusted.

- Press the red 'reset' button. On the lower line in the display, the supply flow temperature T1 of the sensor S1 is displayed.
- Press the 'service button'
- Press the red 'reset' button 3 times. On the display (MI MIN) is displayed.
- Now turn the red potentiometer on the boiler control panel, in order to adjust to the required fixed point.
- The display will be showing the old value to the left and the new value to the right.
- By pressing the 'service button' again the new value will be stored.

6.4.4 adjusting the domestic hot water temp.

If there is a hot water temperature sensor connected, the hot water set point temperature can be adjusted by the green potentiometer.

Adjustable range: 20°C…60°C

The hot water temperature can be read from the display.

6.4.5 hot water thermostat

With a hot water thermostat connected, the required temperature can be adjusted by the thermostat. The green potentiometer, for the hot water preparation is then out of operation and therefore the temperature will not be displayed on the display panel.

6.5 switching off the appliance

- Switch the on/off switch on the appliance control panel
- Turn off the gas supply.

Note: Turning off the appliance will leave the system at risk of freezing during winter months and will put out of action the automatic pump exercising routine. If the only reason for shutdown is that normal heating is not required, it is recommended to leave the boiler on and turn off or turn down any external controls.

6.6 screen display

The screen display indicates information about the operating condition of the Strata 3 in plain text. The displays are distinguished as operation messages (non flashing) and fault messages (flashing).

6.6.1 operation messages (non flashing)

In the case of the following status signals, the Midimat is in normal operating mode.

Standby	No heat demand (boiler not required to be on)
Pre-Purge	Combustion chamber is being pre-ventilated with air from the burner fan
Ignition	The ignition sequence of the burner is initiated
Heat-operate	The boiler is operating in central heating mode
Tap-operate	The boiler is operating to produce domestic hot water
Flue-emission	The boiler is operating in test mode at mid output to enable flue gas emissions to be checked (auto expires after 10 min)
10 min Low	The boiler is operating in engineers test mode for adjustment purposes (auto expires after 10 min)
Post Purge	Combustion chamber is being post ventilated with air following boiler operation
Limit F/R	The flow and/or return temperature is too high (currently)
Fan high	The burner fan is running too fast (currently)
Fan low	The burner fan is running too slow (currently)
Fault room u	There is a fault with the modulating unit (RE 2132) or Cascade manager (KKM2) or a fault in the wiring to these controls (in the case of the RE 2132 controlling the boiler runs continuously in heating mode to protect the building)
Fault Outside	There is a fault in the outside air sensor or in the wiring to the sensor or the DIP switches are incorrectly set to ask the boiler to look for an outside sensor when there is none installed.
Service	The service interval time has expired and the boiler should now be maintained (1 year)
Serv. Button	The service button is being depressed.
De aeration/venting	The boiler pump if fitted is operating to remove any possible collection of air from the heat exchangers. (Occurs when power turned off/on and after reset of fault).

6.6.2 operating data display

The second line of text displays values such as temperature, percentages etc and the red reset button may be used to scroll through (for information) the values of the various sensors that are/may be connected in the boiler plus fan speed.

Table 7 - Sensor Identification

T1:	Flow temperature
T4:	Return temperature
T5:	Domestic hot water temperature* —-: Thermostat opened, or no sensor/thermostat connected 00: Thermostat closed
T6:	Outside temperature*
T7:	Mixer supply flow temperature* (MR 03)
Room 1:	PWM signal from the room unit for the standard heating circuit*
Room 2:	PWM signal from the room unit for the mixer circuit*
Speed:	Fan speed

* These values in the table are displayed only if the corresponding sensor/corresponding room unit are connected to the Strata 3.

The normal status indicator is returned by pressing the ‘reset’ button once more after the display (PUMP 1). If the ‘reset’ button is not pressed for 4 to 5 minutes, the normal status display returns automatically.

6.6.3 Engineers button

This button is reserved for the Service Engineer.

Note: Pressing this button once instructs the Strata 3 to operate at half load. The status indicator shows (EMISSIONS). If the 'Engineers' button is not pressed again within 10 minutes, the Strata 3 switches back into automatic operation.

After further pressing during the (EMISSIONS) display, (10 MIN LOW) appears on the status indicator. In this position, the loading can be adjusted, with the green potentiometer, between 42kW and 210kW (Strata 3 220) or 63kW and 316kW (Strata 3 330).

By pressing the 'Engineers' button during the display of (10 MIN LOW), the Strata 3 switches back into automatic operation. After 10 minutes of '10 min low' operation, the Strata 3 also automatically returns itself into automatic operation.

6.6.4 STB test button

This 'test' button is provided in order to be able to simulate the function of overheating of the heating water. By pressing the 'test' button, the display (LIMIT) appears. During this display, the function of the Strata 3 is shut down. The boiler commences operation when the button is released. If the 'test' button is pressed for longer than 3 minutes, the 'flashing' (STB-WATER 1) alarm appears. The function of the Strata 3 is then locked out.

The Strata 3 can also be locked out more quickly. For this purpose press the 'test' and the 'Engineers' button simultaneously. To restart the boiler following a lockout condition, press the 'reset' button, the Strata 3 returns to automatic operation.

7.0 boiler operation adjustment *(setting of dip switches)*

7.1 adapting the control to the heating system

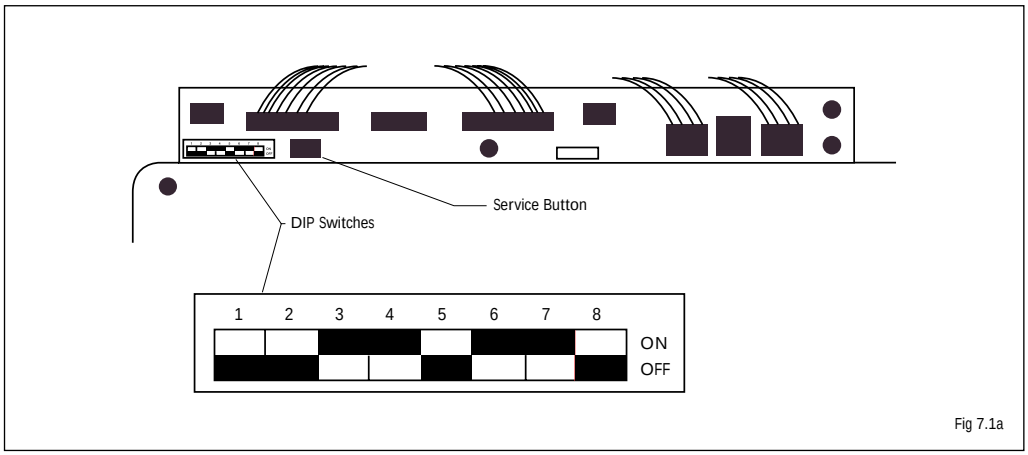


Fig 7.1a

To access the DIP switches, the control panel may need to be removed: (early versions)

- Remove the four screws on the control face.
- Carefully remove the control panel away from the face.
- Do not allow the panel assembly to drop – the panel can be temporarily 'hung' over the casing cross member. See fig 7.1b.

7.1 adapting the control to the heating system (contd)

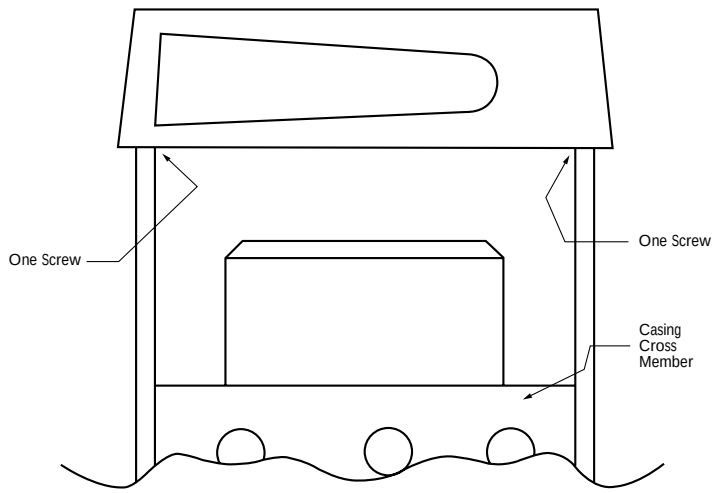


Fig 7.1b

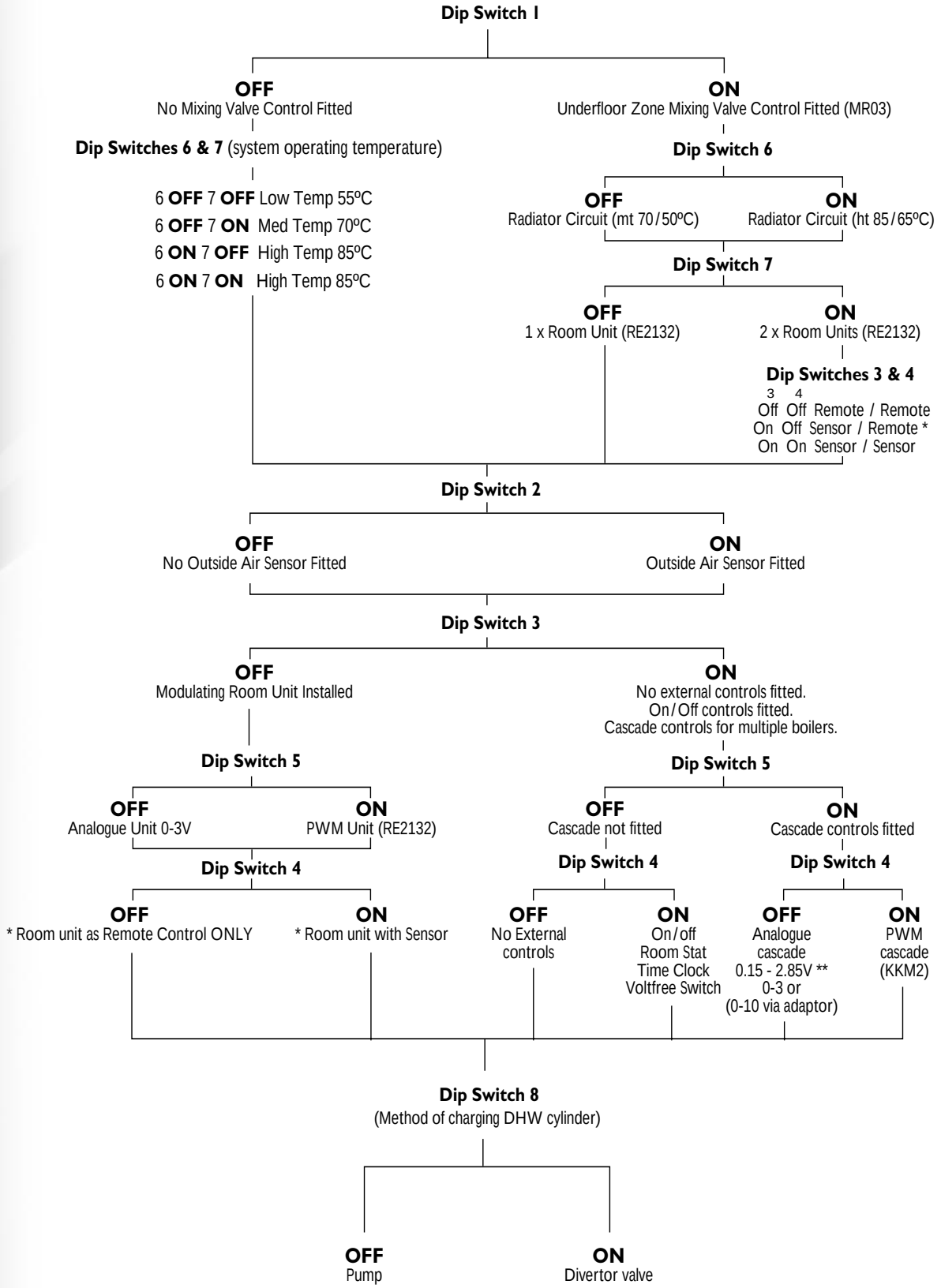
The following specifications must be adjusted:

- Whether the boiler is to be controlled with direct weather compensation.
- Whether an underfloor mixer circuit is connected.
- Whether a room unit, cascade control or a volt free switch are connected.
- Whether the primary heating circuit is a high, medium or low temperature operation.
- Whether a primary pump or a three-way diverter valve are employed for the hot water production control.

Heating Circuit Design

Heating Circuits	Maximum Flow Temperature °C
High Temperature	85
Medium Temperature	70
Low Temperature	55

7.2 DIP switch settings



* Remote = Room unit with temperature sensor turned off and unit acting just as a remote controller

** 0-10 volt control panel via adaptor

Sensor= Room unit with temperature sensor active

8.0 maintenance *and inspection*

8.1 maintenance procedure

After 365 operating days (8760 hours) the message 'service' appears in the display. The following work must then be carried out:

1. Refer to the user with regard to any known problems, or any other comments about the appliance.
2. We recommend that the fault data from the boiler control panel be read via a lap top computer and RS-232 interface. The service software is available from MHS Boilers Ltd. The cause of frequent faults must be identified and corrected.
3. Check the flow and return water connections for soundness.
4. Check the system pressure. Minimum 0.5bar.
5. Remove the casing panels and check the general condition of the boiler visually. Any evidence of leakage must be corrected.
6. Remove the burner. Check the primary heat exchanger for contamination. If required, the primary heat exchanger can be cleaned with a vacuum cleaner or a nylon brush, do not use a PVC or a steel brush. It is not normal to clean or gain access to the flueways of the secondary heat exchangers, for further information, please contact the Technical Department.

Note: The burner must never be touched with the hand and must never be cleaned mechanically, this can cause damage to the surface.

7. Check the bolts for fixing the burner lance to the burner plate. The bolts must be tightened if required.
8. Check the gap between the ignition electrode and the burner (4 to 5mm). If required, bend the ignition electrode cautiously. Do not touch the surface of the burner.
9. Empty and flush out the condensate siphon located behind the rear panel of the boiler.
10. Check the combustion fan for contamination. If required this must be cleaned.
11. Measure the CO and the CO_2 content in the exhaust gas. If necessary regulate the combustion (see section 6).
12. Check the gas carrying components for soundness.

After this maintenance has been carried out, press and hold the 'service' button for 10 seconds. The service signal is then deleted from the display. If the maintenance is carried out before expiration of the service interval and if no service signal has yet appeared in the display, the service button must be pressed for 10 seconds. The indication (SERVICE) appears in the display and the already counted days are set to zero ('0'). For this procedure the boiler must not be in fault condition with a flashing display.

9.0 fault *diagnosis*

9.1 fault list

Possible faults are entered in the following tables. The right column contains the corresponding line numbers of the error correction list – see section 9.2. The error correction list contains possible causes as well as information about the elimination of the fault.

Fault Indication on the Display	Type of fault	Error correction list line number – Section 9.2
(no text)	Strata 3 is turned on, ON/OFF switch does not light up, no indication in the display.	14, 29, 31
(no text)	ON/OFF switch lights up, however, no indication in the display.	14, 29, 31
FAULT RU	Strata 3 does not receive any PWM signal from the room unit or KKM2	1, 2, 4, 33, 44
FAULT OS	Interruption of the connection to the outside temperature sensor	1, 3, 33
IGNIT FAULT	No flame after 4 ignition attempts	12, 13, 15, 16, 17, 30, 31
FLAME OUT	Flame goes out 4 times in sequence in operation	13, 15, 17, 23, 27
STB WATER	STB water limit exceeded*	5, 6, 7, 21, 25, 26, 31
STB EXHAUST GAS	STB exhaust gas limit exceeded*	6, 7, 21, 25, 28
FAN HIGH	Controller identifies fan speed too high	9, 11, 29, 31, 33
FAN LOW	Fan speed too low	9, 10, 11, 18, 29, 31, 33, 44
FAN OP	Fan operation is identified when fan should be off	17, 30
FLAME W/O OP	Flame identified when burner should be off	17, 30
SX INTERRUPT	Connection to sensor x interrupted (S1: flow temperature sensor, S4: Return temperature sensor, S7: Mixer circuit sensor	3, 33
GAS VALVE	Connection to the gas multi purpose valve interrupted	16, 21, 29, 31, 33
EEPROM	Fault during the checking of the EEPROM in the controller	29, 35
FAULT SOFT	Software error in the controller	29, 35
RESET BUTTON	Fault during the checking of the 'reset' button	29, 34, 35
LIMIT F/R	Boiler temperature too high	5, 6, 7
SERVICE	Maintenance interval expired	'45
A3	Connection to the gas multi purpose valve interrupted	16, 21, 29, 31, 33, 35
A6	Fault during the checking of the 'reset' button	29, 34, 35
A7	Fault during the checking of the EEPROM in the controller	29, 35
A9	Software error in the controller	29, 35
A0, A1, A2, A4	Fault in the controller	29, 35

The following faults are visual problems and the right column contains possible error corrections as above, to eliminate these faults.

CO content too high	15, 27
CO_2 content too high	15, 23
CO_2 content too low	15, 27
Yellow flames	'23
Hot water temperature too low	3, 22, 39
Output too low	'22, 15

*STB = Limit Thermostat

9.2 error correction list

The error correction list contains possible causes as well as information about the elimination of the fault.

Line Number	Cause of the Fault	Remedy
1	DIP switch not correctly set	Adjust according to the instructions
2	Room unit KKM2 not connected correctly	Check wiring
3	Sensor not connected correctly or defective	Measure resistance, replace where appropriate
4	Defective room unit/KKM2	Replace room unit, where appropriate
5	Short circuit in the cable to the flow temperature sensor S1	Check cable, replace where appropriate
6	Pump does not turn, possibly seized	Check connections: attempt to turn the shaft with a screwdriver
7	Water loss	Search for leakage and correct, refill system
9	Fan not connected correctly	Check connections
10	Fan is dirty	Clean fan (see section 8.0)
11	Fan is defective	Replace fan
12	Gas shut off valve closed	Open gas shut off valve
13	Gas pressure too low	Check gas supply cross section and gas meter
14	Defective fuse (to the left on the boiler control panel)	Replace fuse
15	Minimum or maximum adjustment at the gas multi-purpose valve not correct	Regulate again (section 6)
16	Gas multi-purpose valve is not connected correctly	Check connections
17	Ignition cable not connected correctly	Check cables for over heating, and security or moisture
18	Defective transformer	Replace transformer
19	Siphon is dirty/blocked	Flush siphon, and check condense waste system is clear
21	Contact resistance at the STB water or at the STB exhaust gas too high	Measure resistance over STB, if resistance is over 1Ω, replace STB.*
22	Resistance in the air supply/exhaust gas system too high	Check length and cross section, possibly clean
23	Flue gas re-recirculation	Check exhaust connections
25	Heat exchanger is dirty	Clean
26	STB water is defective	Replace STB *
27	Incorrect or no gas injector, not mounted correctly	Check gas injector
28	Defective STB exhaust gas	Replace STB *
29	Defective control panel	Replace boiler control panel
30	Incorrect position of the ignition electrode	Carefully bend, the gap distance to the burner must be 4 to 5mm
31	Damp	Wipe up water, possibly dry with an electric hairdryer
32	Mains connection not correct	Check and rectify
33	Wiring interrupted	Check and rectify
34	'Reset' button pressed too long, possibly jammed	Press 'reset' button briefly, check whether it sticks; if the fault does not disappear, then replace boiler control panel
35	Earth wire not attached correctly	Press 'reset' button, check earth connection. If the fault does not disappear, then replace boiler control panel
39	Hot water primary pump does not work correctly	Check pumps, replace where appropriate
44	Fuse 24V defective	Replace fuse
45	Maintenance interval expired	Press service button for 10 seconds and carry out maintenance/inspection.

*STB = Limit Thermostat

10.0 guarantees

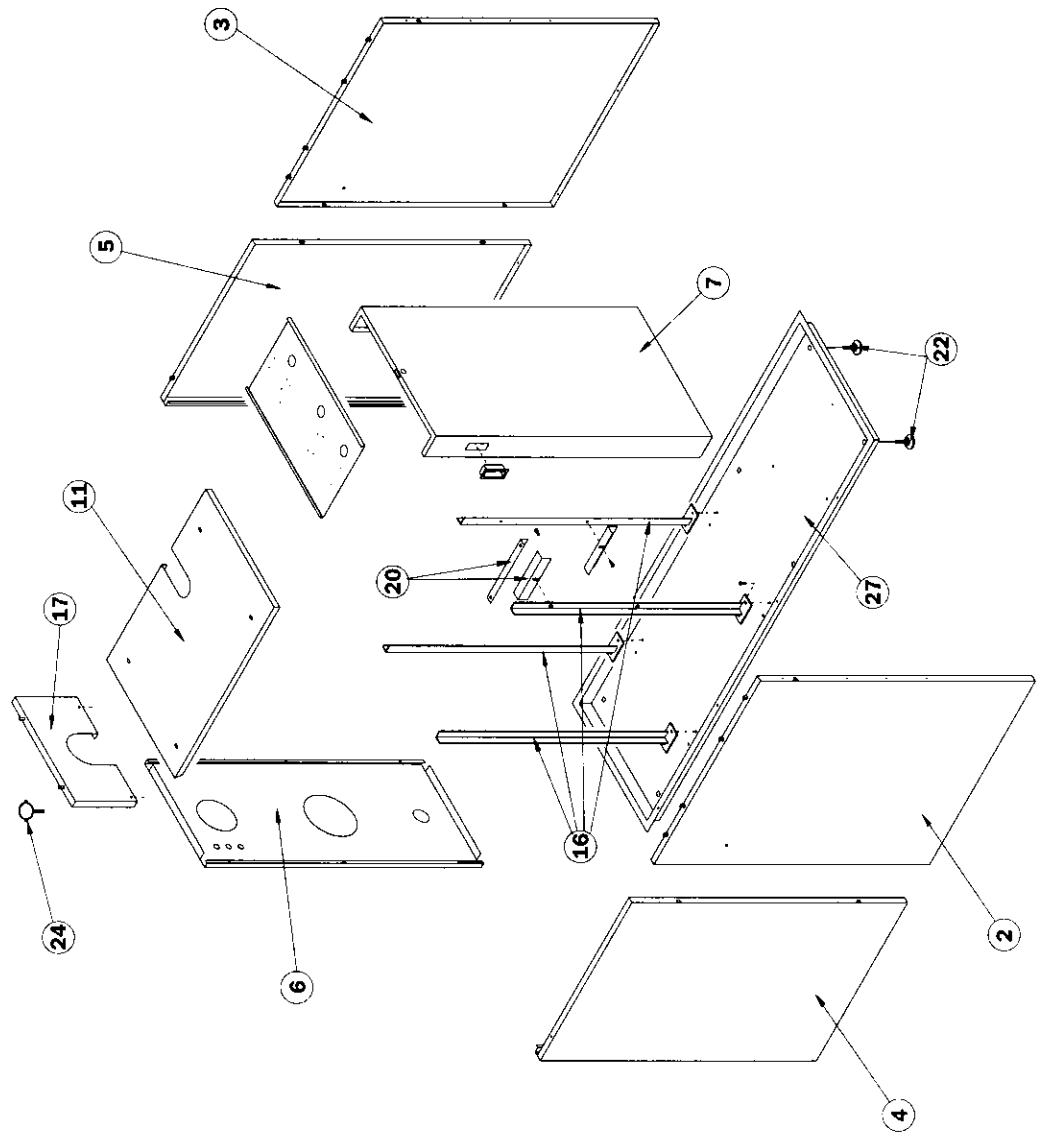
The boiler body and exhaust system both carry a five year guarantee against defect in material or manufacturing process. The burners and all electrical components and other component parts carry a one year guarantee. This guarantee only applies if correct commissioning and regular maintenance has been carried out.

In addition, no guarantee is made for damages which have arisen from:

- Unsuitable and inappropriate use
- Erroneous assembly,commissioning or servicing by unqualified persons
- Erroneous or careless treatment
- Incorrect burner adjustment
- Lack of, or unsuitable water treatment additives
- Non-observance of the installation, commissioning and maintenance instructions
- Inappropriate modifications or repair work carried out by the customer or third parties
- Contaminated combustion air
- Waterside contamination (fouling, scaling etc).

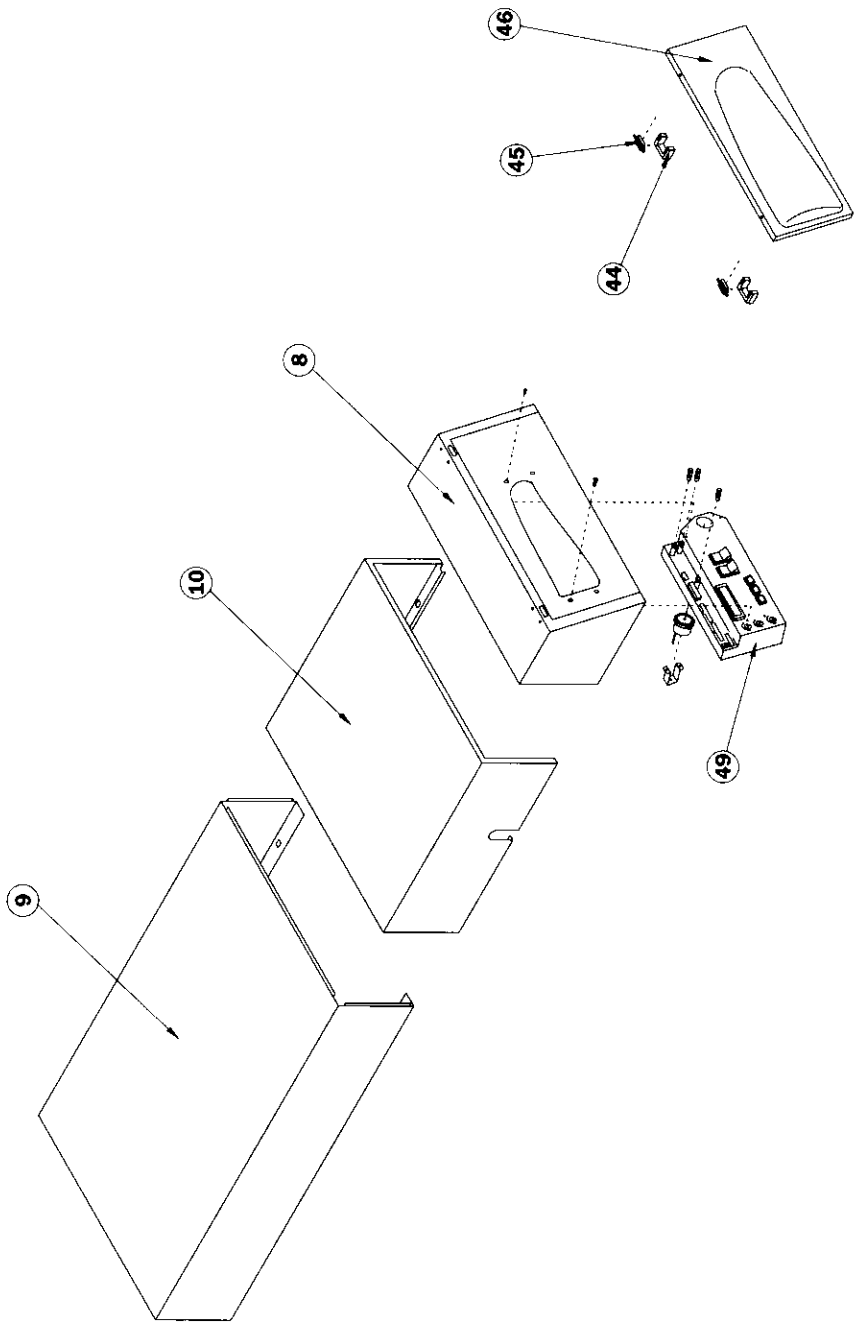
11.0 parts list

Strata 3 220



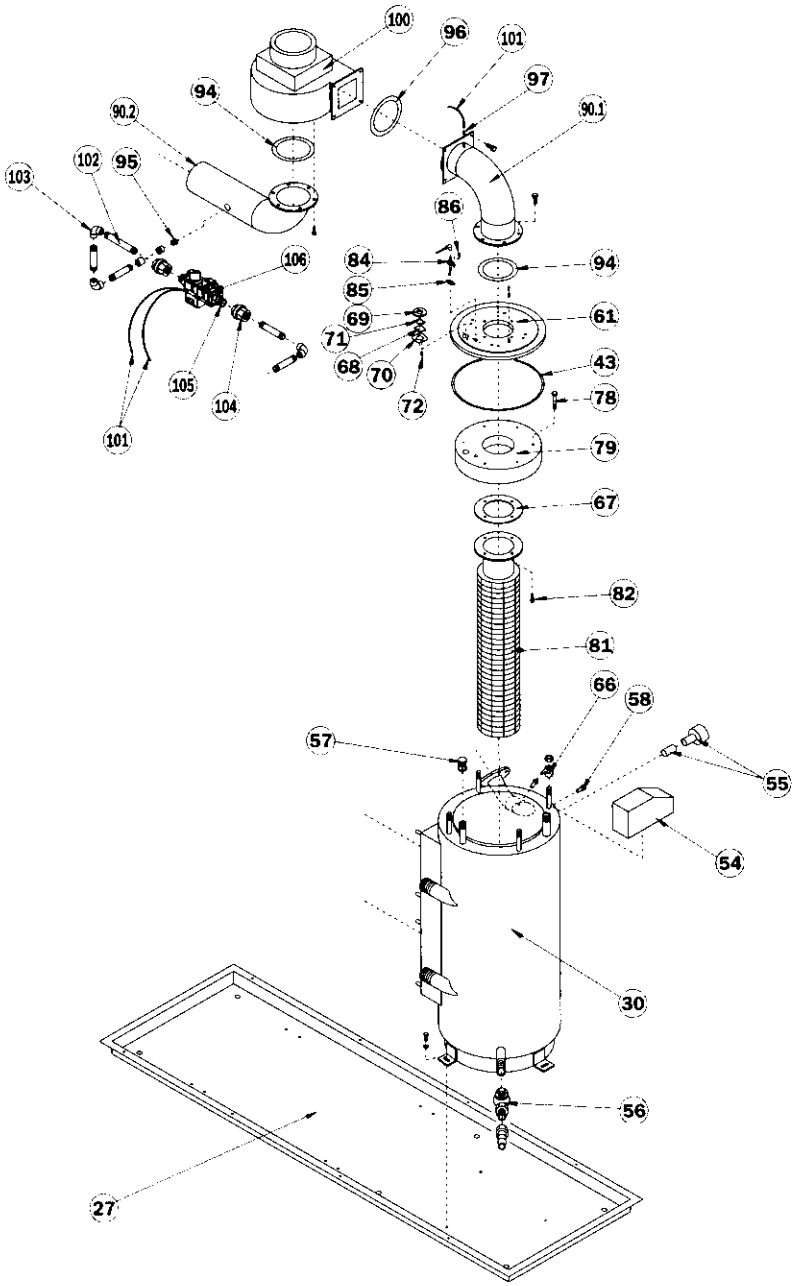
11.0 parts list (contd)

Strata 3 220



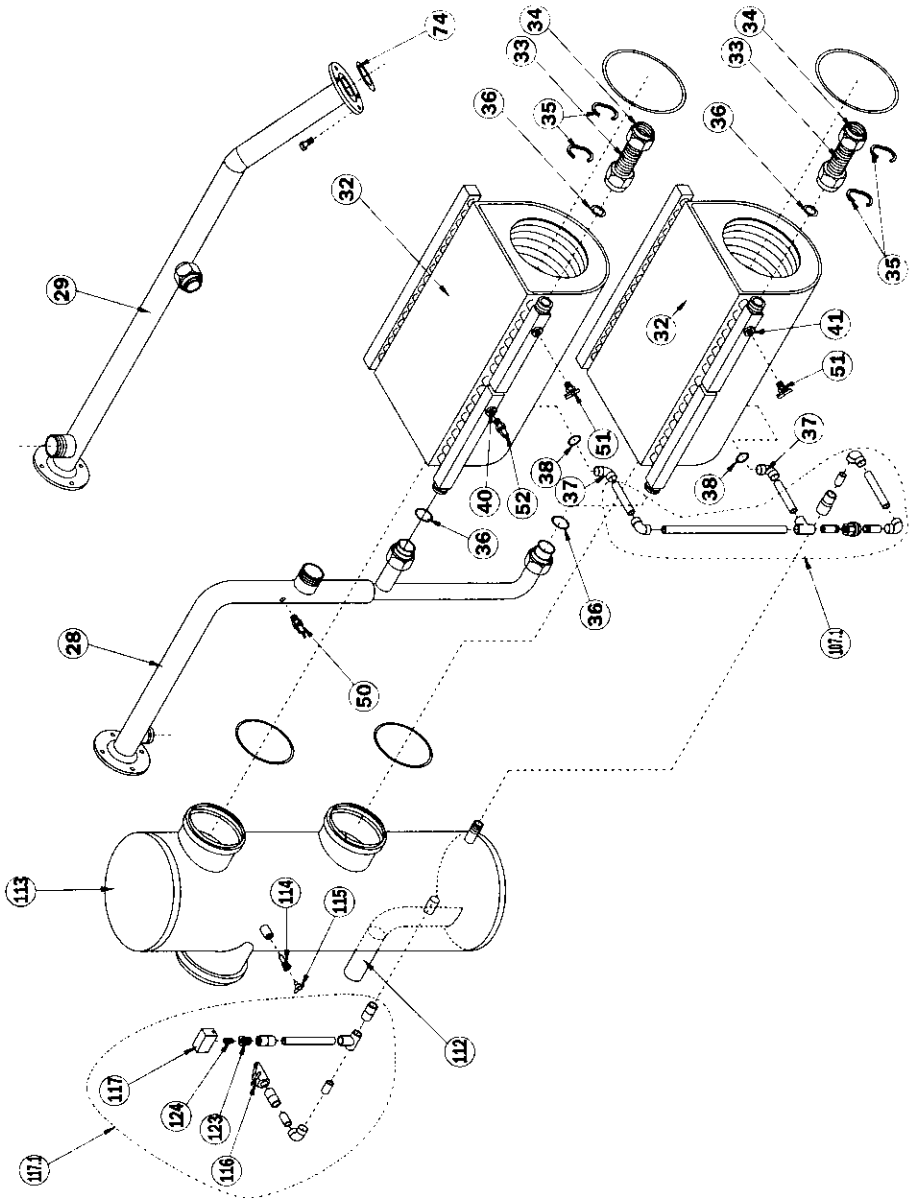
11.0 parts list (contd)

Strata 3 220



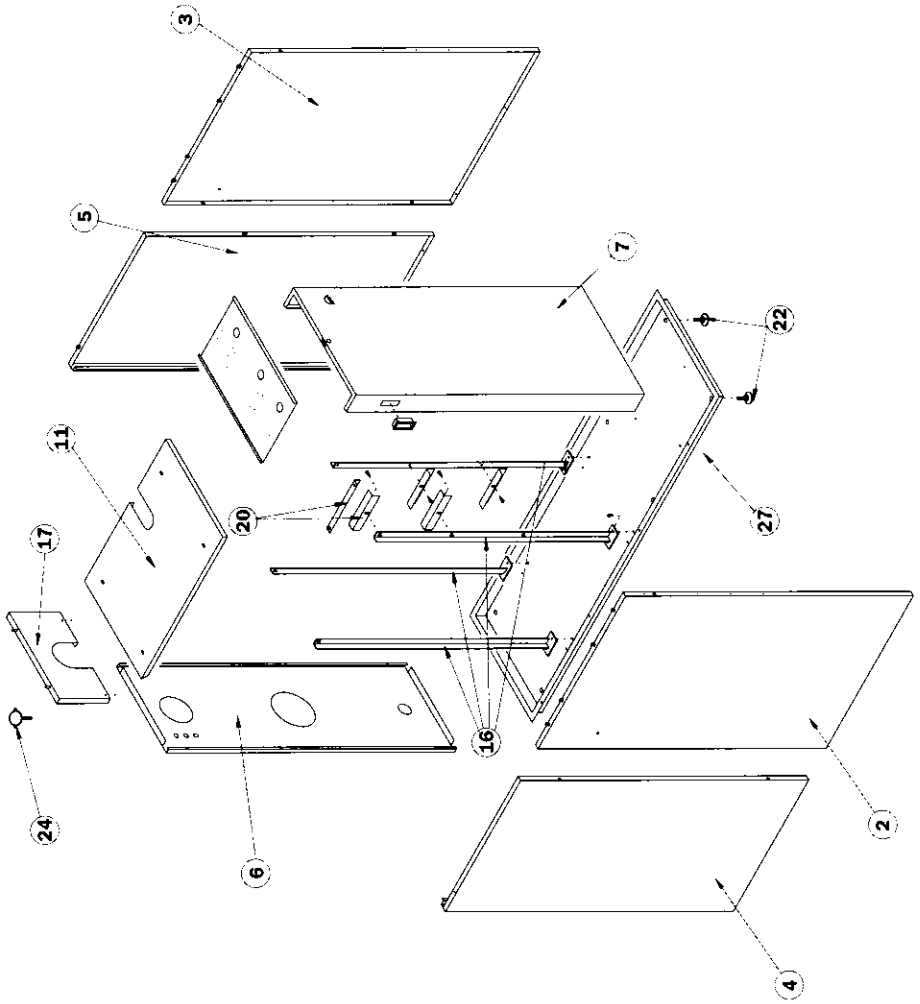
11.0 parts list (contd)

Strata 3 220



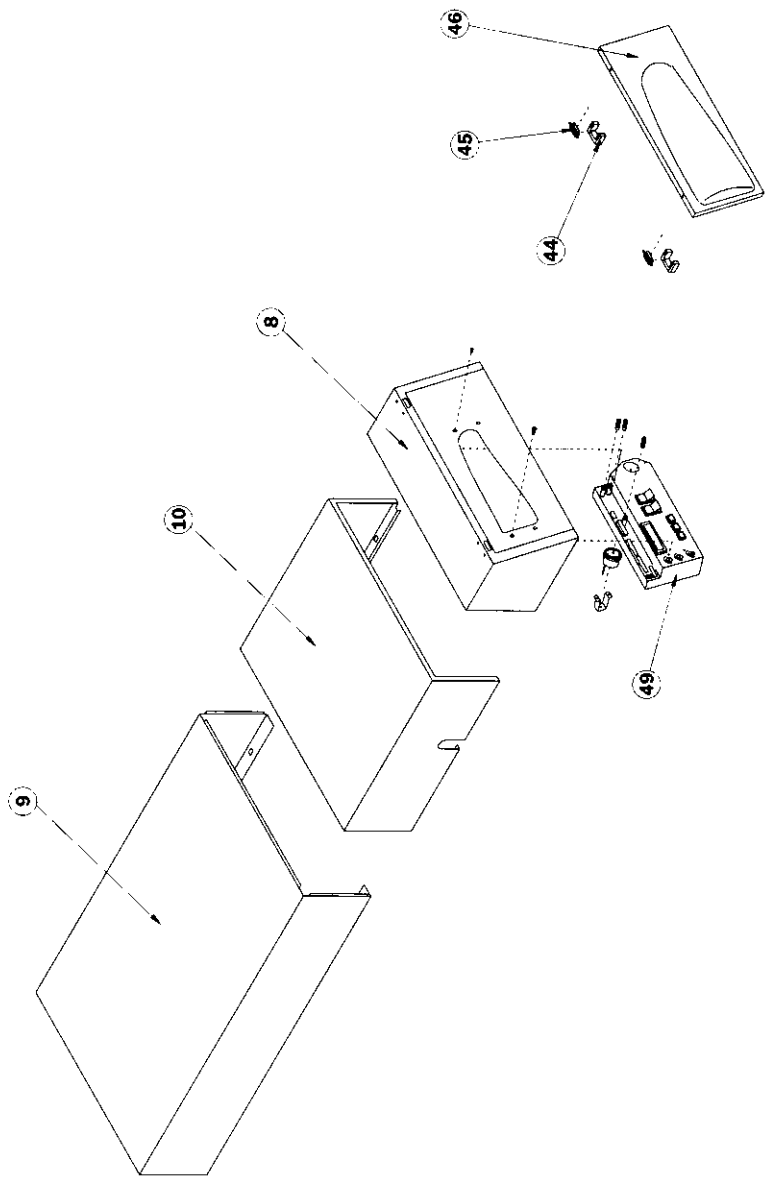
11.0 parts list (contd)

Strata 3 330



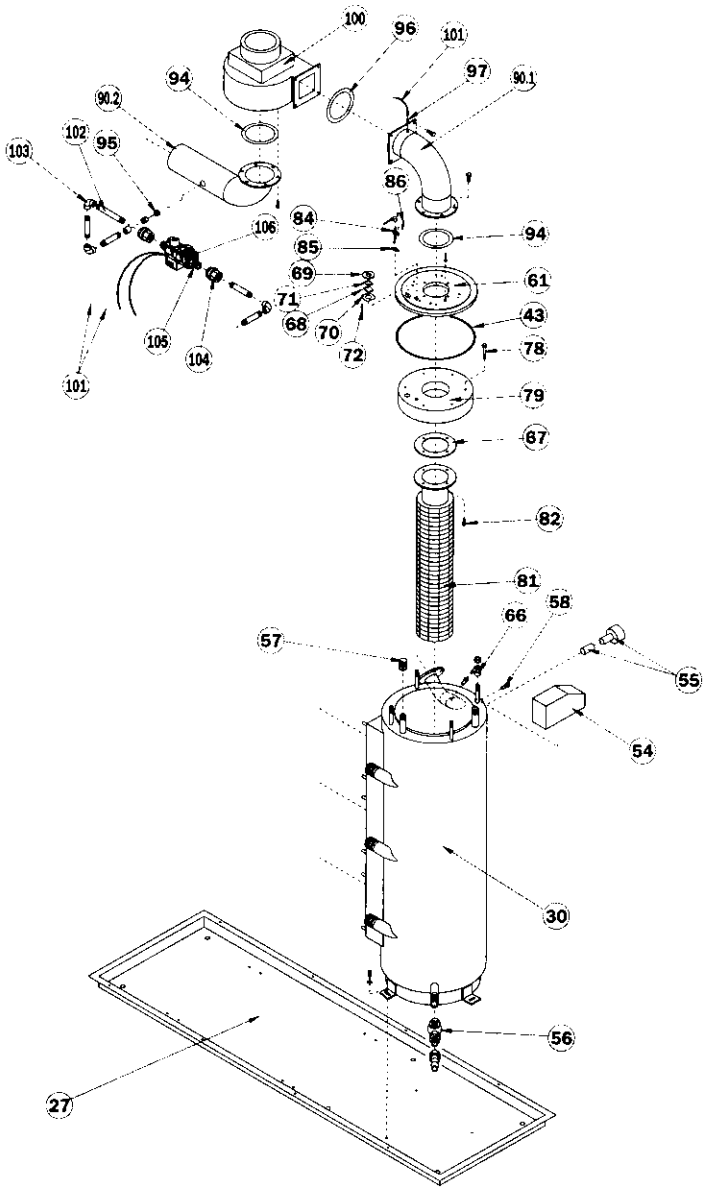
11.0 parts list (contd)

Strata 3 330



11.0 parts list (contd)

Strata 3 330



11.0 parts list (contd)

Strata 3 330